TRANSPORTATION LIBRARY

EXCAVATING ENGINEER

FOUNDED 1905

Western Contracting Corporation, Sioux City, Iowa, using 3-cubic yard rehandling type clamshell bucket, load aggregates going into runway extension at Fort Crook, Nebraska.

Volume XXXIII October, 1944 Number 10

SCHOOL FOR SKILL

SOUTH PACIFIC—A [illegible] unloads a jeep. (Official Navy Photo)

(Signal Corps Photo)

ADAK—A 15-B crane erects a hangar. (Official Navy Photo)

The men who are doing such an effective job of using today's fine excavators as weapons against the Axis, will be ready to apply their war-developed skill to the operation of tomorrow's better machines. The combination will make excavating a vital factor in building a **better** peacetime world.

As in war, Bucyrus-Eries, operated by war-trained men, will produce outstanding results on your postwar work. V-68C

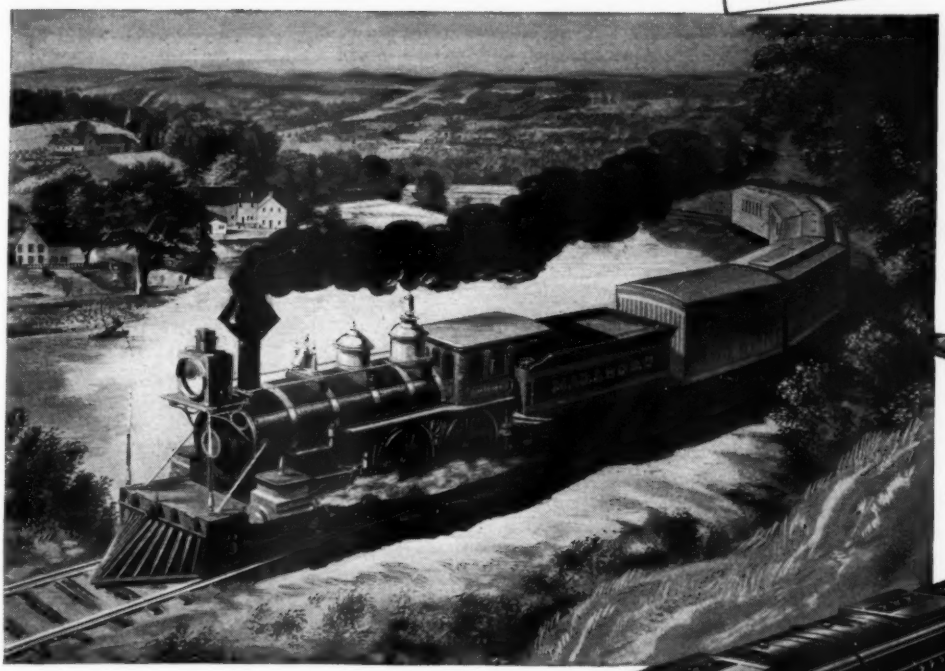
BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

ALGIERS—A 10-B dragline widens a drainage ditch. (Signal Corps Photo)

ALEUTIANS—A 15-B crane unloads supplies. (Official Navy Photo)

TRANSPORTATION LIBRARY



Back in the 60's, locomotives such as the Marlboro of the Boston & Maine Railroad puffed through the Berkshire Hills of Massachusetts, to give the New England of those days the latest in transportation.

Today, 5400-H.P. Diesel locomotives—newest and largest railroad motive power in use on any New England road—haul as many as 125 freight cars at former passenger-train speeds. They are introducing another new era in New England railroading. They have aided greatly in keeping New England warm with their loads of precious oil and coal.

HERALD OF TRANSPORTATION'S FUTURE

IN the spectacular job America's railroads are doing there is a design for finer future transportation.

It centers upon the performance of the General Motors locomotive.

Part of this performance lies in this locomotive's work. It is quick to get away—carries through its job with few or no stops for service—gets there on clipped schedules.

In run after run these locomotives are hauling heavy freight faster than passengers were carried a few years back.

These achievements are elements in railroad progress. They are forerunners of a great new era of transportation efficiency in the days which lie ahead.

KEEP AMERICA STRONG BUY MORE WAR BONDS

GM GENERAL MOTORS DIESEL POWER

LOCOMOTIVES . . . . . **ELECTRO-MOTIVE DIVISION,** La Grange, Ill.

ENGINES . . 150 to 2000 H.P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

ENGINES . . . 15 to 250 H.P. . . . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

Soft going calls for O-P-E-N C-E-N-T-E-R traction

Euclid Model F 13-yard Bottom Dump with Goodyear Sure-Grips on tractor drive wheels and trailer — nonskids correctly reversed on letter.

Grip — and plenty of it — is what moves bigger earth yardages faster. And that means tough tires with a clean, sharp bite that won't clog up and spin helplessly under peak loads.

Top tire for such jobs is Goodyear's Sure-Grip with the great, time-proved O-P-E-N C-E-N-T-E-R *self-cleaning* tread which has no holding pockets, no mud traps to gum up.

See those big, wide, unblocked channels on the Goodyear Sure-Grip pictured here? They sluice out dirt, mud and stones — leave the massive lug bars free and clear to bite deep and keep pulling in any going!

More and more contractors are specifying this great, longer-duty tire because it gives more drawbar pull, more speed, more round trips per shift, more yardage moved per day — *more work at less cost!*

What's more, Goodyear's exclusive multiple-compounded construction and the extra strength of Goodyear's Rayotwist cord carcass help make these the longest-lasting, hardest-working tires ever to roll a prime mover.

Best way to check these claims is to ask the men who have changed to Sure-Grips. When you do, chances are you'll want Goodyears on all your units.

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG for all rock work

ALL-WEATHER EARTH-MOVER for drawn vehicles

SURE-GRIP for drive wheels

Sure-Grip, All-Weather, Rayotwist—T.M.'s The Goodyear Tire & Rubber Company

A PRODUCT OF GOODYEAR RESEARCH

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

EXCAVATING ENGINEER

FOUNDED 1905

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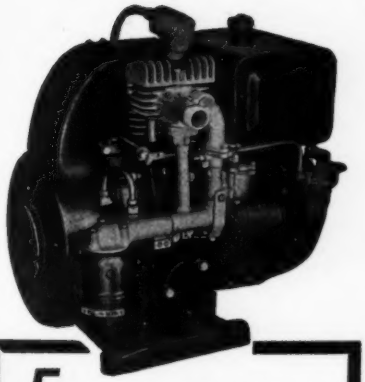

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For Any Job—Anywhere

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Driven by Onan-built, 4-cycle gasoline engines, these power units are of single-unit, compact design and sturdy construction. Suitable for mobile, stationary or emergency service.

Over 65 models, ranging in sizes from 350 to 35,000 watts. A. C. types are 50 to 800 cycles, 115 to 660 volts, single or three-phase. D. C. types from 6 to 4000 volts. A. C.-D. C. combination types available. Write for engineering assistance and detailed literature.

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POWER AND LIGHT FOR EVERY NEED

NATIONAL WAR FUND
★ ★ ★
★ ★ ★
FOR OUR OWN – FOR OUR ALLIES

The "Facts of Life" for wire rope users . . .

EVEN when you start with a good wire rope—such as American TIGER BRAND—treat it right if you want it to give all the life that is built into it.

In this handy 48-page booklet are the things every wire rope user should know about proper rope handling and care.

The easy-to-follow instructions and the practical suggestions it offers are based on the experience of thousands of rope users. They will help you avoid the common errors that shorten rope life and reduce operating efficiency.

Subjects covered include — correct handling of ropes, how and when to lubricate, attaching of clips and sockets, splicing, care of sheaves and drums, minimum safety factors and many other helpful hints that will show you how to keep your wire rope operating at maximum efficiency and for the longest possible time.

Right now, with seasoned operators few and far between, this handy guide to better rope performance is doubly valuable. This booklet is free. Send for as many copies as you need and get them into the hands of the right men.

Send for FREE WALL CHART, too

The ten vital rules of wire rope care and handling are graphically illustrated and briefly described in this attractive wall chart. Printed in colors, on a 15" x 21" heavy cardboard mount, it can be placed for ready reference wherever wire rope is being used. Acts as a constant reminder of good wire rope operating use and practice.

Excelloy Preformed

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

USS

UNITED STATES STEEL

A LETTER

THAT INDICATES THE KIND OF SERVICE YOU GET WHEN YOU BUY A NORTHWEST

GENERAL CONSTRUCTION COMPANY
337 SOUTH HIGH STREET
COLUMBUS, OHIO
ADams 7823

May 29, 1944

Northwest Engineering Co.
28 E. Jackson Blvd.
Chicago, Illinois

Gentlemen:

We wish to thank you for the prompt and efficient way you have taken care of our requests for repair parts.

Although the maintenance and repairs of our Northwest Shovels are the lowest of any shovel which we use, it is indeed gratifying to know that when an occasional repair part is needed, your firm has certainly co-operated with diligence and promptness. Considering the present times, that is certainly an achievement, of which you should be proud.

We believe that you not only have a good product, but also that you co-operate with the user from the time the product is sold and for as long as the user operates it, that, gentlemen is just as important as the quality of the product itself.

Thanking you,

Yours very truly,
GENERAL CONSTRUCTION CO

L. A. Guzzo (Partner)

LAG/al

We never have been great believers in testimonial letters. We have always felt that anyone could secure a testimonial letter from his friends. But when this unsolicited letter from the General Construction Company of Columbus, O., came in it was so sincere, so gratifying and so indicative of the type of service we maintain for Northwest users that we decided it was worth your reading, too.

Remember Northwest never obsoletes a Northwest in service. You can always get parts for your Northwest no matter what the model.

NORTHWEST ENGINEERING CO.
1750 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Illinois

-and when you have a real Rock Shovel you won't have to worry about output in dirt

NORTHWEST

SHOVELS ..... CRANES ..... DRAGLINES ... PULLSHOVELS

GAR WOOD
ROAD MACHINERY

Make your blueprinted plans NOW for postwar earthmoving . . . make sure Gar Wood 2 and 4 Wheel Hydraulic Scrapers, 4 Wheel Cable Scrapers, Hydraulic and Cable Dozers and Trailbuilders, Hydraulic and Cable Rippers and Tamping Rollers are included in your Equipment Plans. This is double assurance that your planning is up to the minute.

Look to Gar Wood and BE READY

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is Sold Through
ALLIS-CHALMERS
Dealers Everywhere

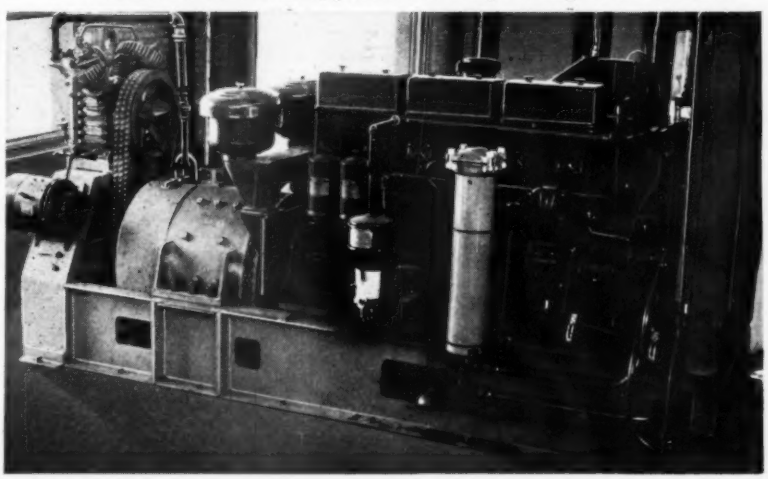
ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

HOW TO SOLVE OPERATING PROBLEMS WITH *Correct Lubrication*

KEEP CRANKCASES, PISTONS, VALVES AND OIL PASSAGES

CLEAN

Delvac "900 Series" oils resist the oxidizing effect of high temperatures in crankcases, furnish strong detergent action, provide sturdy films to minimize wear, protect hard-alloy bearings from corrosion.



And keep your Diesels on the Job!

ON HIGH-SPEED, high-load Diesels like these, the big lubricating problem is oxidation deposits such as sludge, "varnish" and "lacquer."

To fight sludge and deposits, use an oil that not only resists their formation but also holds them in suspension so they can be drained out.

Delvac "900 Series" oils give you remarkable anti-oxidation and detergent properties—help keep crankcases clean and free of sludge—pistons, rings and valves free and active—protect hard-alloy bearings against corrosion.

Even under the most severe operating conditions, you get maximum hours "on the job." You save maintenance time and expense with longer periods between overhauls.

SOCONY-VACUUM OIL CO., INC.
Standard Oil of New York Division • White Star Division • Lubrite Division • Chicago Division • White Eagle Division • Wadhams Division • Magnolia Petroleum Co. General Petroleum Corporation of Calif.

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Lubricants

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

Call in Socony-Vacuum for Diesel Fuels & Lubricants

WITH BUCYRUS-MONIGHANS IT'S *All Weather* PERFORMANCE

When bad weather makes footing too soft for other excavators, your Bucyrus-Monighan walking dragline will keep going, delivering the big output for which it is famous. Smooth walking traction carries it safely, surely around trouble — the large bearing area provides solid footing even in soft muck. Long reach, quick swing, fast hoisting, and controlled lowering insure fast digging.

That's the essence of the Bucyrus-Monighan performance story—the result of "years-ahead" design and construction, the reason you get your excavating work done **fast** with a Bucyrus-Monighan on the job.

Plan now to include field-proved Bucyrus-Monighans in your excavating equipment. Take advantage of their all-weather performance for quick solutions to your digging problems.

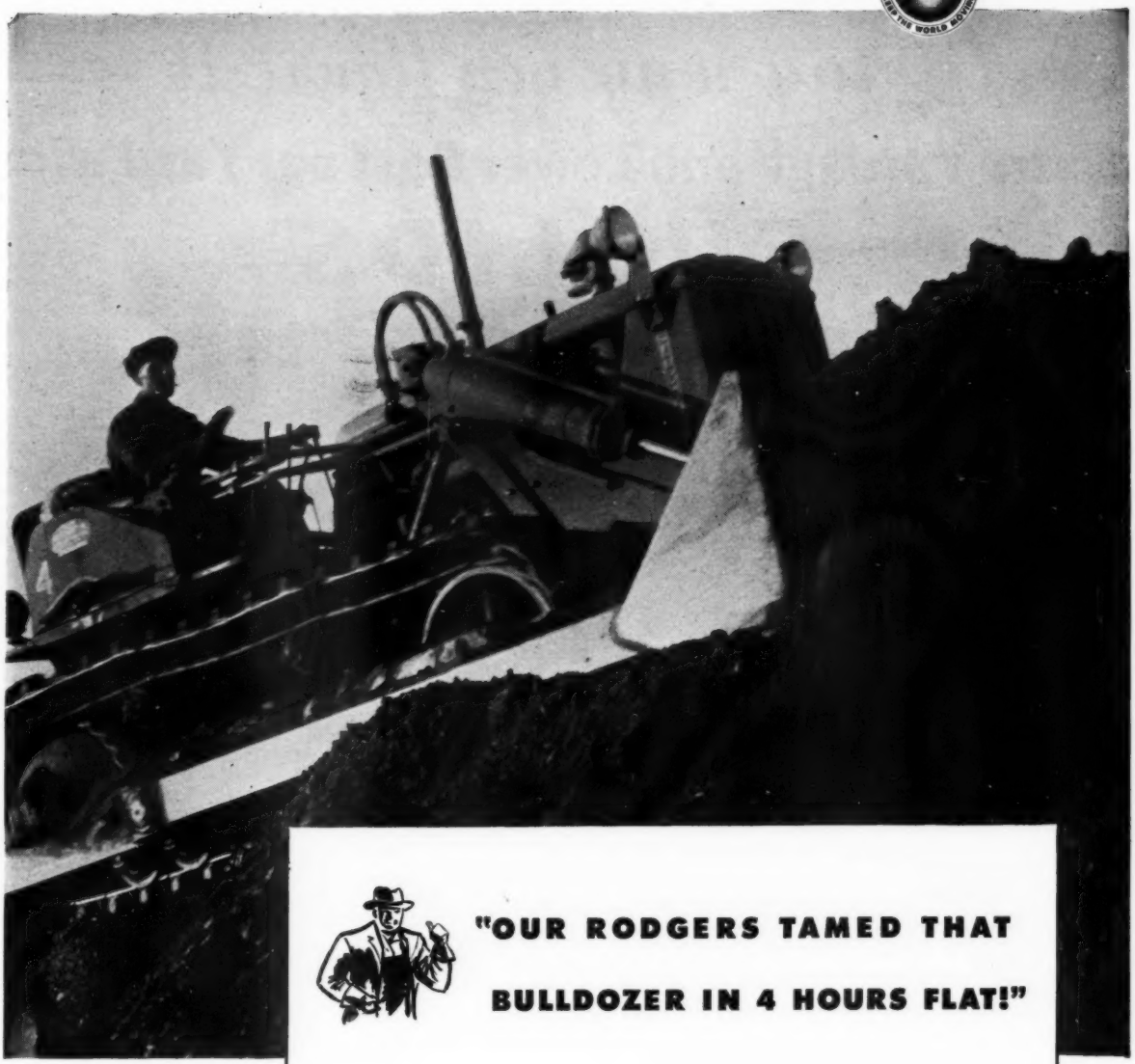
Sold by

BUCYRUS-ERIE COMPANY

"Years Ahead" Excavators for the Years Ahead

SOUTH MILWAUKEE, WISCONSIN

IF IT'S A RODGERS IT'S THE BEST IN HYDRAULICS



"OUR RODGERS TAMED THAT BULLDOZER IN 4 HOURS FLAT!"

NO. 19 OF A
"READY-WITH-A-RODGERS" SERIES

"The first job our Rodgers Track Press did for us opened our eyes. It was on a bulldozer that needed new track bushings—a job that used to take at least a couple of days.

"In four hours flat, that bulldozer was all fixed up snug and tight with new pins and bushings, ready to go to work. We don't mind track repairs any more—our Rodgers takes 'em all in stride."

This experience is typical—maintenance men agree that the Rodgers Track Press shortens layups for tractor repairs—saves time and money. It will pay you to get the full story on the Rodgers Track Press . . . write or wire for complete information and prices. *If it's a Rodgers, it's the best in hydraulics.* Rodgers Hydraulic, Inc., Dept. B-10, St. Louis Park, Minneapolis 16, Minnesota.

RODGERS HYDRAULIC, Inc.

Any way you figure it——

Extra Yardage and Lower Cost per Yard with

EUCLIDS

● It doesn't take a slide rule expert or a lot of trick mathematics to prove that Rear-Dump and Bottom-Dump EUCLIDS increase production and haul earth, rock, coal and ore at lower cost per ton or yard. Built to haul loads of 15 to 30 tons in off-the-highway service at speeds up to 34 m.p.h., Euclids carry more payloads per day and keep hauling costs down.

Using efficient digging and loading equipment with fast, economical Euclids you can move big yardages faster and at lower cost on all lengths of haul. Compare Euclid speed and capacity with other types or combinations of earth moving equipment and you'll know why leading contractors everywhere are using Euclids now or are planning to replace their present equipment with efficient Euclids as soon as they can.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE

EUCLID THE PIONEER

Teamwork— the American Way!

✓ THE JOB—Airstrip on Kwajalein

✓ THE POWER—International Diesel

✓ THE BUILDERS—Uncle Sam's Own Seabees

—*Official U. S. Navy Photo*

• HERE'S A TEAM to be proud of . . . International Diesel TracTracTors and the Navy's Seabees. This team is making construction history in the Pacific.

There's no job too tough for these fighter-builders. Construction of roads, docks, bridges, airstrips and camp sites is their daily fare. So is the constant, vigilant maintenance of these naval installations. Add to this a variety of other dirt-moving jobs that pave the way for airpower, footpower and firepower. No wonder one of the Seabees' mottos is: "We *defend* what we build."

• • •

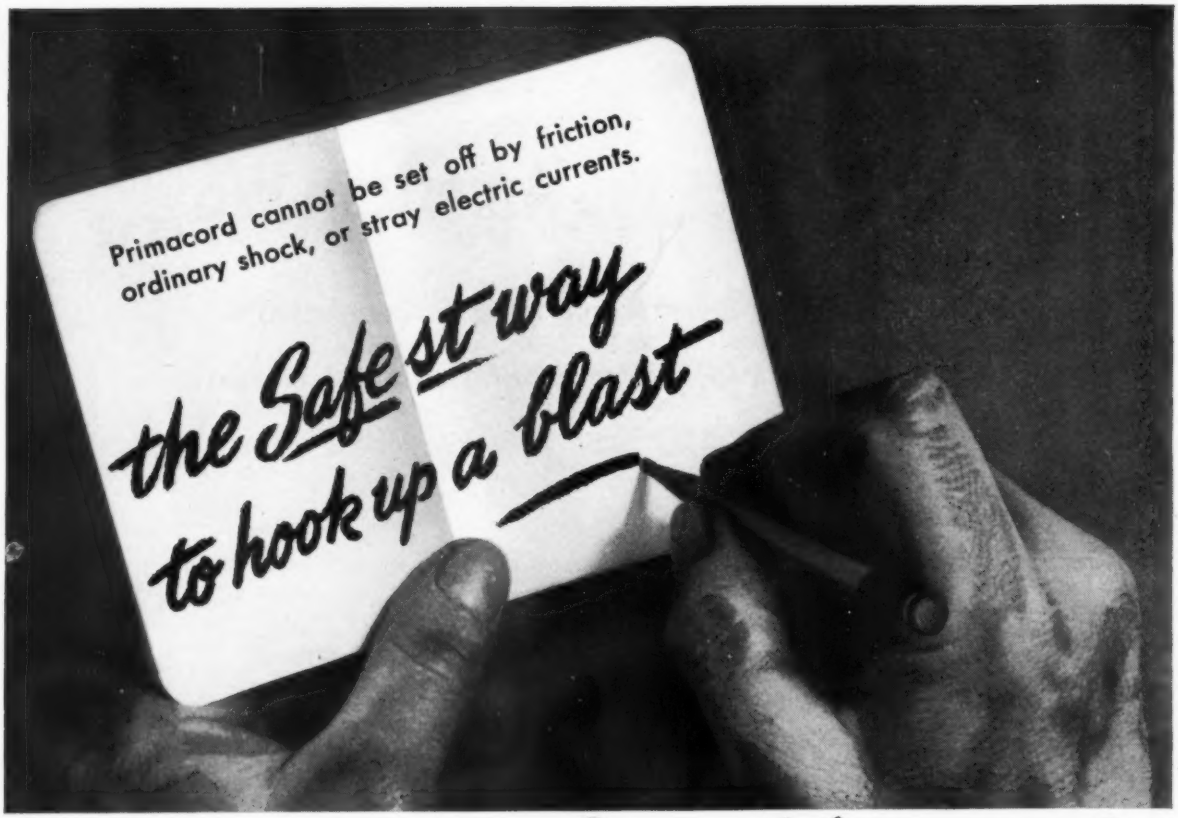
The TracTracTors you're doing without this year are serving on Kwajalein, Saipan, Funafuti, the Solomons, Bougainville, Guadalcanal. That's why it's up to all tractor operators on the home front to conserve equipment and make it last.

Harvester and the International Industrial Power distributors stand ready to see you through.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL HARVESTER

Power for Victory . . . Power for Peace



It all means *Less Hazard..*

when you use

PRIMACORD

PRIMACORD-BICKFORD
Detonating Fuse
Manufacturers of Safety Fuse since 1836

1. You merely *tie* the first cartridge onto the Primacord and lower it to the bottom of the hole.
2. You can load the proper number of dynamite cartridges into the hole as an unbroken column, or decked as required. The Primacord will detonate *all* the cartridges.
3. You have less hazard due to stray electric currents such as might be caused by thunder storms or power line "leakage."
4. You connect all holes with Primacord and apply one blasting cap at the end of this trunk line *only* after everything is ready for the blast.

Primacord, the insensitive Detonating Fuse, is universal practice for large blasts in quarries and many open pit mines. For the smaller blast, where a few holes are hooked up to go simultaneously, many operators prefer to use Primacord because of its ease of handling and safety features. Send for the Primacord book.

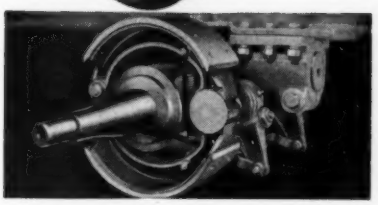
21

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

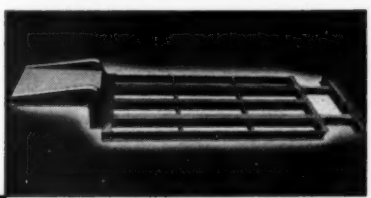
Engineering WHERE IT Counts

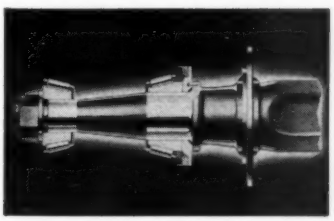
A CARRYALL would seem a relatively simple type of Trailer to build. Actually, however, because of the size of loads carried, it takes unusually careful design to engineer in extra strength at the critical points.

Such precision engineering is reflected in Fruehauf's clean-cut, sturdily-constructed gooseneck, in the size and placement of main and supporting members. It extends even to less apparent details such as patented rocker-beam, trunnion-type axles; mountain-type brakes; and slack adjusters which permit on-the-road brake adjustments. In every detail of design and construction, you can depend on Fruehauf for *engineering where it counts.*

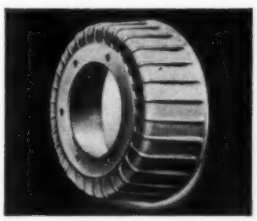


4 Brakes are of the rugged, simple, two-shoe type. Wide molded lining, ground true with the drum, to provide maximum heat dissipation.





1 Bearings are of the oversized, heavy-duty, tapered roller type. Their size, plus extra wide spacing, make for an easier rolling unit, as well as longer life, lower maintenance costs and constant correct wheel alignment.



2 Brake drums are of Meehanite alloy . . . the most efficient braking surface yet devised. No other material maintains its shape so well under the heat of braking heavy loads.

3 360° Slack Adjusters simplify brake service. Save on maintenance costs. Permit perfect on-the-road-adjustments.

5 Frame is of electrically welded construction — far superior to riveted design which requires additional members at points where frame members are riveted together. Lighter-weight—greater strength and rigidity.

6 Two emergency vacuum tanks provide braking even after the truck engine has stopped running. 1720 cubic inches of stored vacuum power—enough for several emergency brake applications.

7 Brake cylinders on models equipped with rocker-beam trunnion are located within the trunnion — giving direct, positive braking. Eliminates the need for long cables or rods which make difficult the maintenance of equalized braking.

8 Trunnion type axles are all molybdenum steel. Each has double bronze bushings with a grease cavity between for perfect lubrication. They oscillate freely to compensate for uneven road conditions.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY • DETROIT

Service in Principal Cities

Modernized Marblehead

• Top: One of the Bucyrus-Erie 120-B 5-cu. yd. electric shovels loading a 20-ton Easton side-dump trailer with blasted limestone in the eastern section of the Marblehead quarry of the Kelley Island Lime and Transport Co. Arch carries shovel cable over road. Bottom: Another Bucyrus-Erie 120-B loading trailer in another section of the quarry.

Huge limestone quarry operated by Kelley Island Lime and Transport Company for past half a century increases production through modernization program that included replacement of seven steam shovels by three Bucyrus-Erie 120-B electric shovels and substitution of truck-trailer haulage for railroad system.

THE KELLEY ISLAND LIME and Transport Company of Cleveland, Ohio, has been taking a fine grade calcium content limestone out of its Marblehead, Ohio, quarry for about 50 years, but recently the quarry and the crusher equipment was modernized and now production is highest in the history of the operation.

Working two 10-hour shifts a day for six days a week, the 195 men employed in the Marblehead quarry are producing an average of 12,000 tons of limestone a day. The greater part of this production, about 10,000 tons daily, is flux stone (4" to 6"), now so much in demand by steel mills. Production of ¾-inch stone averages 1,000 tons daily, and the daily production of regular meal (4.5 mesh) runs to 1,000 tons. The regular meal product is sold for agricultural purposes now in great demand.

In addition to the production of these regular non-processed limestone products, the Marblehead quarry is equipped with a drying plant and grinding mill for making dry meal (seven mesh), also for agricultural purposes. The plant is equipped to produce 15 tons of dry meal an hour.

About one-fourth of the production is sold in bulk and the remainder is packaged at the plant.

Even before limestone was sold from the Marblehead quarry the Kelley Island Lime and Transport Company produced lime here. After over half a century of operation, the lime kiln at Marblehead was closed last March due to labor shortage. All available men are needed to work in the quarry, crusher plant, and drying plant and grinding mill and the other quarries operated by the Kelley Island company can furnish enough lime to meet present reduced market needs. Besides, the flux stone and agricultural meal production is far more essential to the war effort.

Area of Quarry

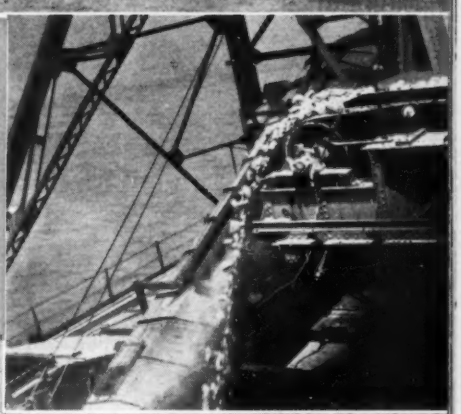
The Marblehead quarry is roughly about three and one-third miles by two miles in area, with the probability of more territory becoming available for operation when a present state-owned road to the east of the present quarry is relocated westward over the floor of mine-out pit area. The company now owns the land to the east of this road. The quarry and the adjacent town of Marblehead, whose population of about 1,000 is almost solely dependent upon the quarry for its livelihood, are situated at the eastern extremity of a peninsula in Lake Erie, forming one arm of Sandusky Bay to the south.

Although quite inaccessible via public transportation facilities, the quarry is ideally situated for the shipment of its products by both rail and water. The company owns its own ship-loading dock at the site, and the Lakeside and Marblehead Railroad, a Kelley Island Lime and Transport Company subsidiary, connects with the New York Central line at Danbury, Ohio. Four locomotives and five crews are used on the Lakeside and Marblehead Railroad, which in addition to hauling cars of limestone to the New York Central line at Danbury, hauls its own cars between the crusher plant and the dock. The New York Central brings in the cars used for rail shipment of stone.

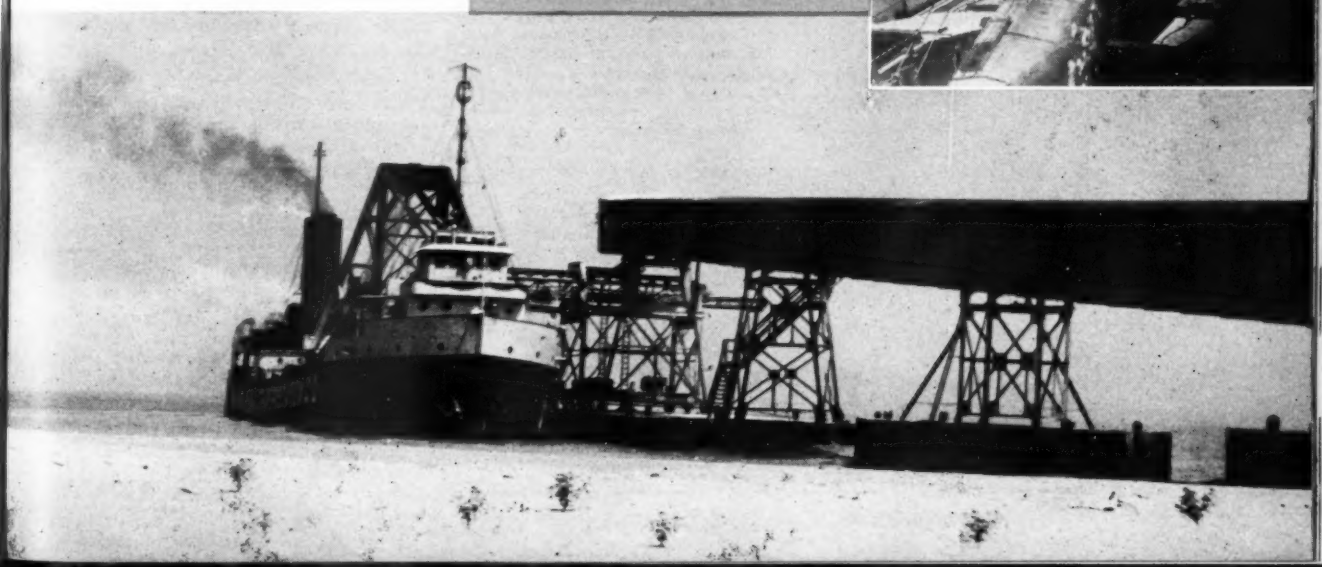
Shipment of Product

During the lake season, from about March 15 to December 1, about half the production of the Marblehead quarry is shipped by boat and half by rail. When the lake is closed to shipping, rail shipments are increased and stockpiles are built up. The quarry is operated the year around.

Three years ago the narrow gauge steam railroad line with its 17 dinkey engines and 200 cars used for hauling stone from the quarry to the crusher was replaced by a truck and trailer haulage system. Fourteen 20-ton Easton steel body side-dump trailers with Mack truck prime movers were purchased for quarry haulage. A unique feature of the truck haulage system is that the former dinkey engineers, all older men, many of whom never even drove an automobile up to that time, were given first opportunity to drive



• **Above: Loaded Easton side-dump trailers at building housing two primary crushers. Right: Closeup of 700-foot ship-loading conveyor belt that has a capacity of 1,000 tons an hour. Below: Ship being loaded at end of dock at quarry site.**



• Two of the Lakeside and Marblehead Railroad's four locomotives in the roundhouse formerly used by the quarry for the dinkey engines that were replaced by 14 trailer-trucks for pit haulage.

the trucks. After a trying "break-in" period, these men, all of whom are well past middle age and many of whom are past 60, made good and for the past three years they have been handling these modern high-powered gasoline engine trucks with the same dexterity and efficiency that they formerly operated their "iron horses."

The converted engineer-truck drivers are apparently grateful to the company for the opportunity given them and are mighty proud of their new steeds. Now that they have learned to operate the trucks efficiently you couldn't get one of them to give up his seniority and change jobs for love or money. They are all steady workers and company officials are satisfied with their work.

Just about a year ago another major modernization program was carried out at the quarry when seven old-time Marion Model 91 and 92 steam-shovels were retired after years of faithful service and replaced by two modern Bucyrus-Erie 120-B 5-cu. yd. Ward Leonard all-electric shovels. Later a third 120-B was added to the quarry equipment.

In many sections of the Marblehead quarry the limestone outcrops and at no place in the area owned by the company is it below more than three or four feet of soil that is often covered with a dense brush and tree overgrowth. The limestone in the quarry averages 21 feet in depth and ls underlaid with a black flint rock. Tests have indicated that another limestone strata occurs beneath the "black rock", but due to the large area of surface stone still available at Marblehead it is not probable that the limestone under "black rock" will ever be quarried.

Stripping Overburden

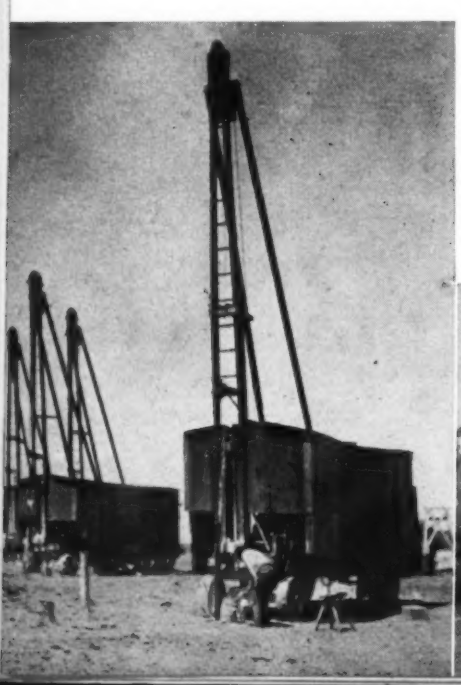
Stripping the shallow overburden in the quarry is done during the warmer months by two four-wheel scrapers after the brush has been cleared by bullgraders. An Allis-Chalmers tractor and a 12-cu. yd. Gar Wood scraper and a Caterpillar tractor with a LeTourneau 9-cu. yd. scraper strip the topsoil from the area cleared by the bullgraders and dump it in a previously quarried area. At the time of the writer's visit to the quarry the dumping area was about 1,000 feet from the area being stripped. Some difficulty was being experienced in getting the scrapers fully loaded in one run. A matting of brush and tree roots blocked the scrapers' cutter openings and prevented dirt from boiling into the bowls. Even after two runs it was not unusual for the scrapers to lack heaped loads.

Two Allis-Chalmers tractors, one equipped with a Baker bulldozer and the other with a new Buckeye centro-lift tiltdozer, are used for clearing the land to be stripped of trees and brush. Practically all trees that grow in the quarry area are very shallow-rooted and can be pushed over by the dozers with little trouble. To get as much area as possible stripped before these operations are discontinued for the winter months because the ground freezes too solid to make this style of stripping practical, stripping operations are carried on for two ten-hour shifts a day during the months when the ground is not frozen.

In addition to brush clearance the dozers are also used to maintain the haul roads, clean up the quarry floor, clean the surface areas for the drills after a blast, and for general utility purposes.

After the ground is stripped the limestone bank is blasted to make the stone available for loading to the truck-trailers by the electric shovels. The quarry area now being worked is a huge right angular area with one of the 120-B's working the outer side of each of the legs of the angle. The third shovel is spotted near the juncture of the legs of the quarry angle. This third shovel is not operated continuously as are the other two. It is used to keep the crusher plant fed with stone during the time a long move is being made by one of the working shovels and it is also ready for emergency loading operations if one of the other shovels has to be shut down for repairs or to change dipper teeth or rope. The third shovel guarantees quarry officials continuous and uninterrupted operation of the crusher plant and customers of a steady supply of stone.

The three Bucyrus-Erie electric shovels in the Marblehead quarry are designated as shovels Nos. 2, 3 and 4. No. 1 shovel is used in another of the company's quarries.



• Left: Four of the company's seven Loomis well drills preparing bank for the next blast. Below: Allis-Chalmers tractor and 12 cu. yd. Gar Wood scraper stripping shallow overburden that has been cleared of brush by bulldozers.

Blast Hole Drilling

Seven Loomis well drills, six of them using 4⅝-inch bits and the other using a 5⅝-inch bit, are operated 24 hours a day in two 12-hour shifts. Four of the drills are used in the section of the quarry being loaded out by shovel No. 3 and the other three drills are used to drill blast holes near Shovel No. 2 which is working in the eastern end of the quarry. Occasionally some of the drills are moved when it becomes necessary to prepare the bank near the shovel that is used when one of the other shovels is temporarily idle.

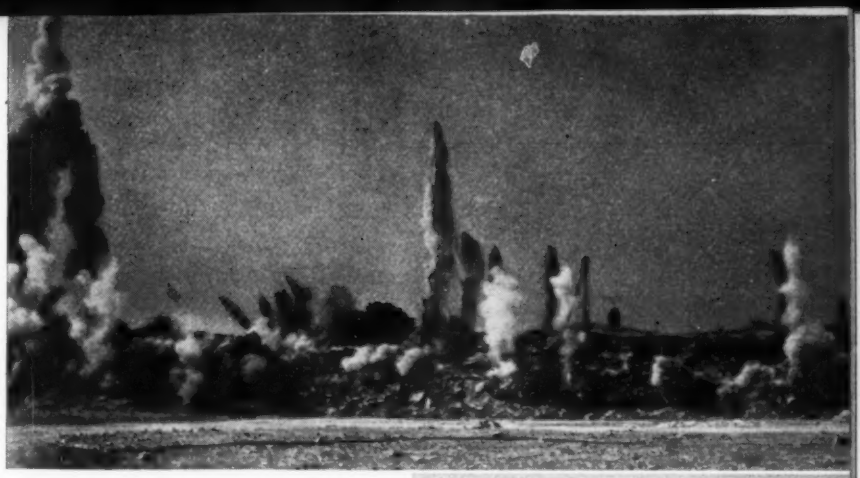
Five of the Loomis drills were converted to electric power when the electric shovels were introduced into the quarry. The other two drills are powered by gasoline engines. All seven drills are mounted on iron wheels and the drill machinery is enclosed in wooden houses. Hemp rope is used on the drills. Each of the drills is operated by a two-man crew and it takes about three hours to drill a hole about 21′ deep to the bottom of the limestone strata. Bits are resharpened in the quarry's own machine shop on location. Water to lubricate the bits is hauled to the drills in a 2,000-gallon Dodge tank truck and stored in steel drums. This tank truck is also used for sprinkling haul roads to lay the dust.

Primary and Secondary Blasting

About 10,000 tons of stone are blasted at a time at the Marblehead quarry. The 4⅝-inch holes are loaded with 4-inch dynamite and the 5⅝-inch holes made by the one drill are loaded with 5-inch dynamite. It is planned to have all drills use 5⅝-inch bits for the use of 5-inch dynamite in the future. Du Pont's Red Cross dynamite and Du Pont plastic caps are used for blasting. From 50 to 60 holes are usually shot in one blast. The holes are drilled in an 18′ x 9′ unbalanced spacing pattern and the ordinary shot covers an area about 250′ long and 27′ wide. Thirteen cubic feet to a ton is the figure used as a basis for calculating the amount of stone blasted in a shot. The ratio of stone blasted to the amount of explosive used ranges from three to four per cent.

Steve Meterko, foreman of the blasting crew, reports that last year over 700,000 pounds of dynamite was used at Marblehead and that if production is continued at the present rate from 800,000 to 900,000 pounds of explosive will be used this year. Over 25,000 exploders are used in a year.

Secondary blasting is required to break up the larger rocks to a size

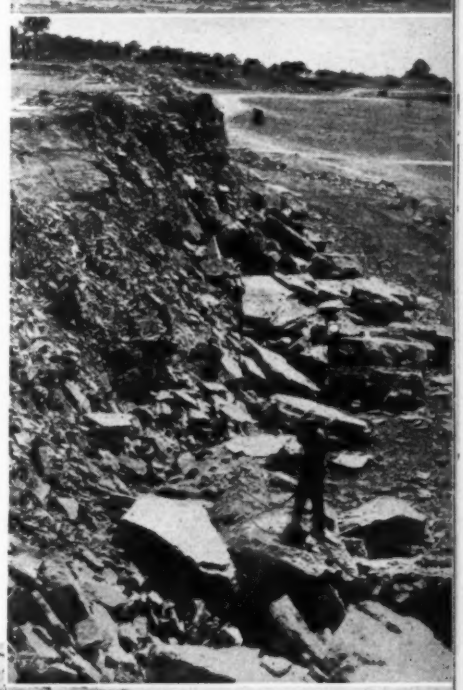


• **Top: Blasting 8,465 tons of stone in a shot 284 feet long and 25 feet wide. There were 55 holes packed with 2,750 lbs. of DuPont's Red Cross dynamite and 10 secondary shots were exploded along with the primary blast. Right: A 10,644-ton 50-hole blast 250 feet long and 27 feet wide.**

that can be handled by the shovels. During loading operations the shovels leave rock too large to handle along the quarry face and these rocks are given a secondary blasting either before the next shot is taken on the adjoining quarry face, or on the same hookup with the primary blasting of the next face.

A Cleveland pneumatic jackhammer with a 1½" bit and an Ingersoll-Rand compressor mounted on a Ford truck is used for drilling secondary blasting holes. If the blasting crew can get far enough ahead with its regular blasting work as many as 100 secondary holes are shot at a time. However, often time does not permit the crew to prepare this many secondary holes for blasting before the quarry face behind the larger rocks on the pit floor needs another primary blast and so 10 to 20 secondary shots are exploded along with the primary blast.

In loading out the stone the Easton



• **Right: Cleveland pneumatic jackhammer with a 1½" bit powered by an Ingersoll-Rand compressor is used for drilling secondary blast holes. Below: Blasting crew under Steve Meterko (second from left) will use over 800,000 pounds of explosive and 25,000 exploders at Marblehead this year.**

• **Left: Working down the quarry face this Bucyrus-Erie 120-B electric shovel is loading out newly blasted rock. Three or four passes fill a trailer. Above: The other working 120-B loads out rock about a half-mile from its mate. The operator lowers his dipper over the trailer before tripping the dump to save wear and tear on the trailer body.**

trailers are spotted near the front of the shovels on haul roads running parallel to the side of each of the two shovels. The shovel operators lower the dippers into the body of the trailers before dumping to save wear on the trailers. It takes about three or four passes to fill a trailer and then the shovel operator signals the truck driver to pull out by sounding a horn on the shovel and the next truck pulls into position and is spotted by the time the dipper is again loaded and swung into dumping position. The shovel operator keeps the haul road near his machine clear of larger rocks that may fall from the dipper or from the trailer during loading operations. Smaller stones are cleared by a pit man assigned to each of the shovels. The shovels are oiled when shifts are changed at 4 p.m. and are greased each shift during operation by the oiler assigned to each shovel.

All oilers are able to operate and so they relieve the regular operator for about an hour each shift.

Dipper teeth are resurfaced about once every three months. The worn teeth are built up with Amsco nickel manganese steel and are then given a hard coating with Coast Metals, Inc., rod manufactured at Canton, Ohio. Teeth used on shovel dippers in the Marblehead quarry as well as those used in other Kelley Island Lime and Transport Co. quarries, are built up and hard-surfaced in the Marblehead quarry repair shop—headed by Theodore Pokey, master mechanic. There are 34 men working one nine-hour shift six days a week in the repair shop. A reduced staff is kept in the shop on Sundays.

Electric Power

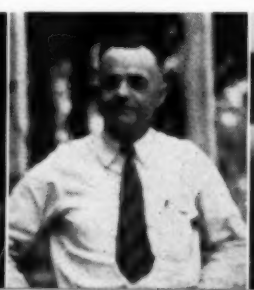
Electric power for operating the shovels, drills, and crusher plant is purchased from the Ohio Public Service Commission. The electricity is brought by a pole line to transformers located in about the center of the pit operations at 33,000 volts. The power is reduced to 2300 volts for use by the shovels and another transformer further reduces it to 440 volts for the drills and crusher plant use.

Truck Haulage

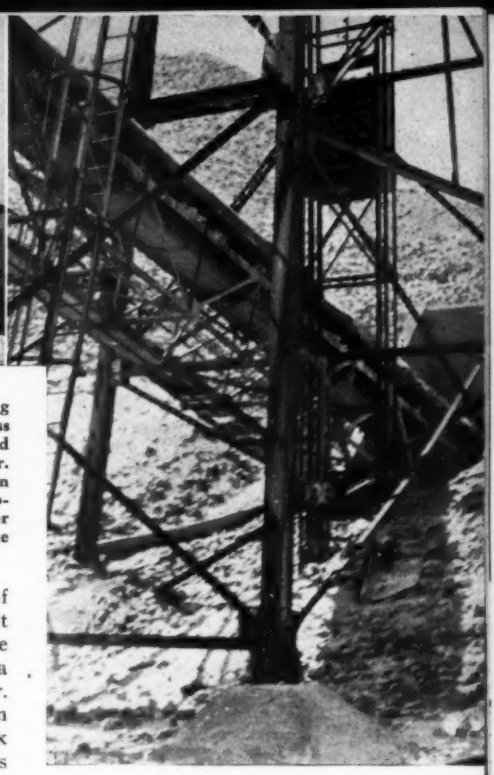
Twelve of the company's 14 hauling truck-trailers are used at a time while the remaining two are kept for emergencies. Each of the truck-trailers hauls up to 40 loads per 10-hour shift with an average load of 16 tons each. The haul from each of the shovels to the crusher is about 2.6 miles round trip. The trucks average a little under three miles to the gallon of gasoline in dry weather and in wet weather get a little less mileage. Most of the trucks are gassed twice a shift, each five hours of operation, but a few of them have auxiliary gas tanks that hold enough gasoline for the entire shift. A former roundhouse building used by the quarry when dinkey engines were the mode of haulage is now used as a garage for the trucks.

The trucks haul the stone from the pit to two No. 24 Allis-Chalmers primary crushers housed in a building adjacent to the screening plant. Easton automatic dumpers, huge hooks that catch the side of the trailer body and raise it by cable so that the load dumps into the crusher pit from the other side of the trailer, are used at Marblehead. This method of dumping is thought by company officials to be faster than using hydraulic dumps on the trucks. The trucks alternate dumping into each of

• **Left: Oilers assigned to shovels grease during operation on each shift. The shovels are oiled when shifts are changed at 4 p.m. Below: Hook of Easton automatic dumper hoists side of trailer body to dump its load in the primary crusher. Another dumping hook can be seen over head of man in lower right.**



• **George L. Clezie, quarry superintendent (left), and Walter Myers, quarry foreman.**



• Above: General view of crushing and screening plant. Stone in excess of what can be loaded to cars and trucks is stockpiled by conveyor. Right: Stone from the stockpile can be brought back to the plant hoppers for loading by this conveyor system running to the bottom of the stockpile.

the primary crusher pits. Two trucks can be dumped at the same time.

Crushing and Screening Plant

The bottom of the crushers is 45 feet below the surface and two endless type bucket elevators on 175′ centers carry the stone from the primary crushers to No. 800 Tyrock screens from which stone under six inches is taken out. Over six-inch size passes on to Allis-Chalmers No. 8 secondary crushers and then empties back into the secondary elevator buckets and is re-screened. The stone passes to four 48-inch 30-foot long Allis-Chalmers revolving screens which take out the three, two and one-inch material. Another screen takes off the fines used for agricultural purposes.

There are four loading hoppers in the crushing and screening plant, each of 300-ton capacity. Three of the hoppers are used for loading different sized stone to railroad cars and the other hopper is used exclusively for loading trucks. Trucks, of course, can also be loaded from the other hoppers. Excess stone that cannot be loaded out of the plant fast enough to keep the hoppers from overflowing is carried out to an adjacent stockpile on a conveyor belt. Stone from the stockpile can be brought back into the plant hoppers by means of another conveyor plant running from the bottom of the stockpile.

Shipment of Product

Stone shipped by rail is loaded directly to the cars that run under the hoppers and it is then hauled by the Lakeside and Marblehead Railroad to the Danbury connection with the New York Central line. Stone for boat shipment is loaded to Lakeside and Marblehead cars and hauled to the dock hopper that has a capacity of 4,500 tons. A 700-foot conveyor belt runs from the dock hopper to where ships moor to the dock and has a loading capacity of 1,000 tons an hour.

About 50 cars of an average 60-ton capacity each are loaded with flux stone at the crusher plant hoppers each 10-hour shift. Fourteen cars of three-inch, seven cars of two-inch and three cars of ¾-inch stone are also loaded each shift. About 40,000 tons of flux stone are kept in reserve in stockpiles and about 45,000 tons of agricultural stone is stocked. Stockpiles become larger in the winter when there are no boat shipments.

Drying and Grinding Plant

Three 10-ton Mack dump trucks are used to haul waste from the crusher plant, mostly ¾" stone not used at the dryer and grinding plant which is used principally for the maintenance of haul roads.

About 14 men are employed at the mill and dryer plant where finer grade agricultural limestone is produced. There is in this plant a 60-foot long rotary dryer which uses hot air from a stoker fired boiler. The dryer can handle 15 tons of stone an hour and the two mills can grind this amount of dried stone. The Mack dump trucks haul much of the ¾-inch waste stone and screenings to the grinding mill and dryer plant.

Drainage of quarry pits is one of the chief problems confronting the officials of the Marblehead quarry. Two 8-inch electric pumps and one 8-inch and one 4-inch gas driven pump are used to keep the quarry floor dry.

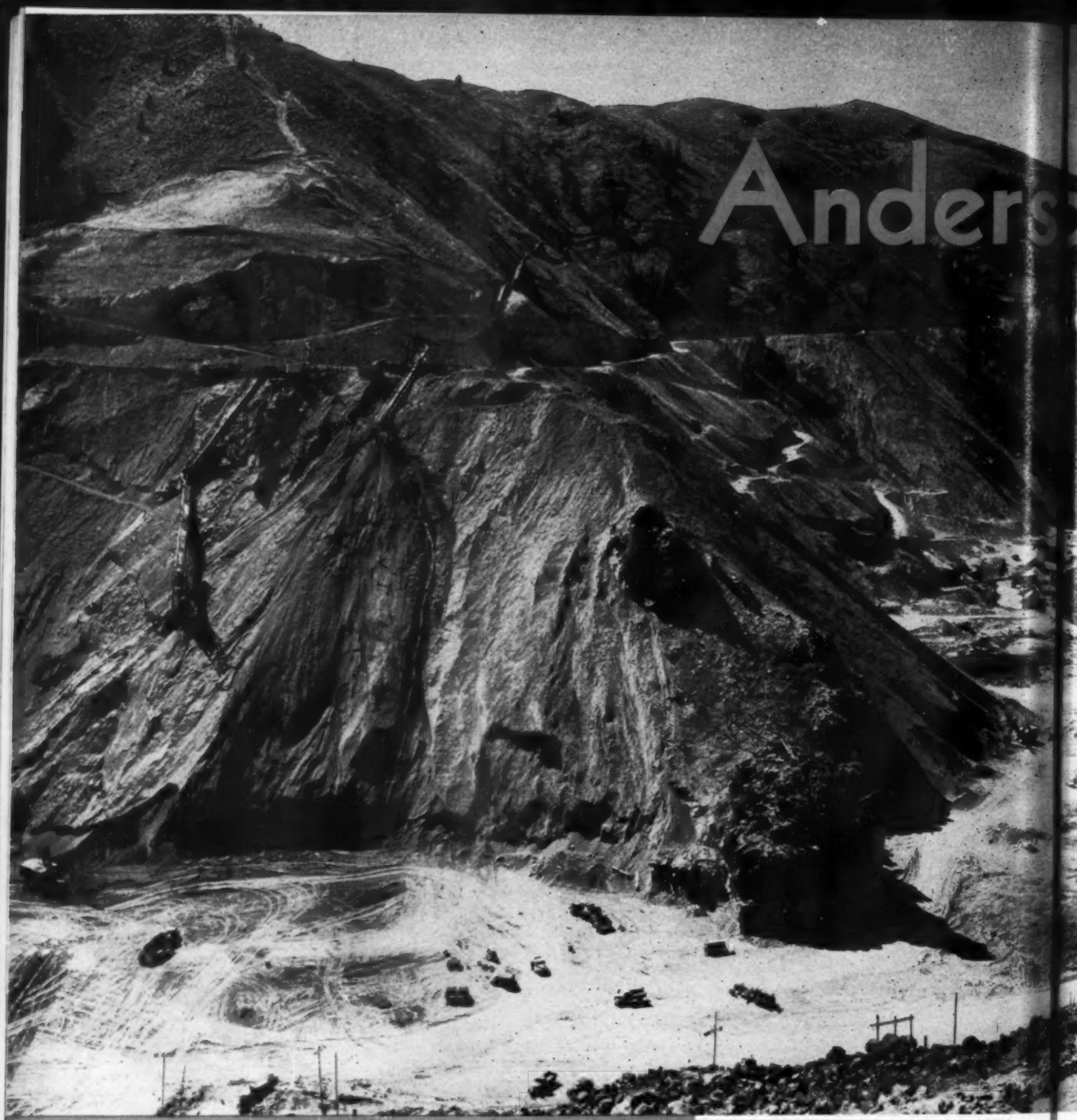
Personnel

George L. Clezie is superintendent of the Marblehead quarry; Walter Myers is quarry foreman, and William McDonald heads the crusher and screening plant. Executive personnel of the Kelley Island Lime and Transport Company includes: Ralph Dickey, president and general manager; H. M. Beatty, assistant to the president and manager of operations; A. B. Mack, first vice-president; F. W. Kuhl, secretary and treasurer; J. J. Guerin, assistant to the president and E. C. Harsh, chief engineer.

In addition to the Marblehead quarry the Kelley Island Lime and Transport Company operates quarries at Gibsonburg and Clay Center in Ohio; Rockfort, Michigan, and a lime plant at Buffalo. The quarry at Kelley Island, from which the company got its name, was abandoned about two years ago.

• Coal used in the drying plant is loaded to railroad car by Browning steam locomotive crane equipped with a clamshell bucket. This clamshell is also used for loading out stockpiled material, especially meal.

• William McDonald, superintendent of crushing and screening plant (left), and Theodore Pokey, master mechanic.



America's highest earthfill dam being built by Morrison-Shea-Twaits-Winston Company will have a structural height of 444 feet and a crest length of 1,350 feet when it is completed in 1946 as a major unit in the plans for the development of southwestern Idaho. The dam will have a volume of 9,600,000 cubic yards and a storage capacity of 500,000 acre-feet for a combination of irrigation, power, and flood control purposes.

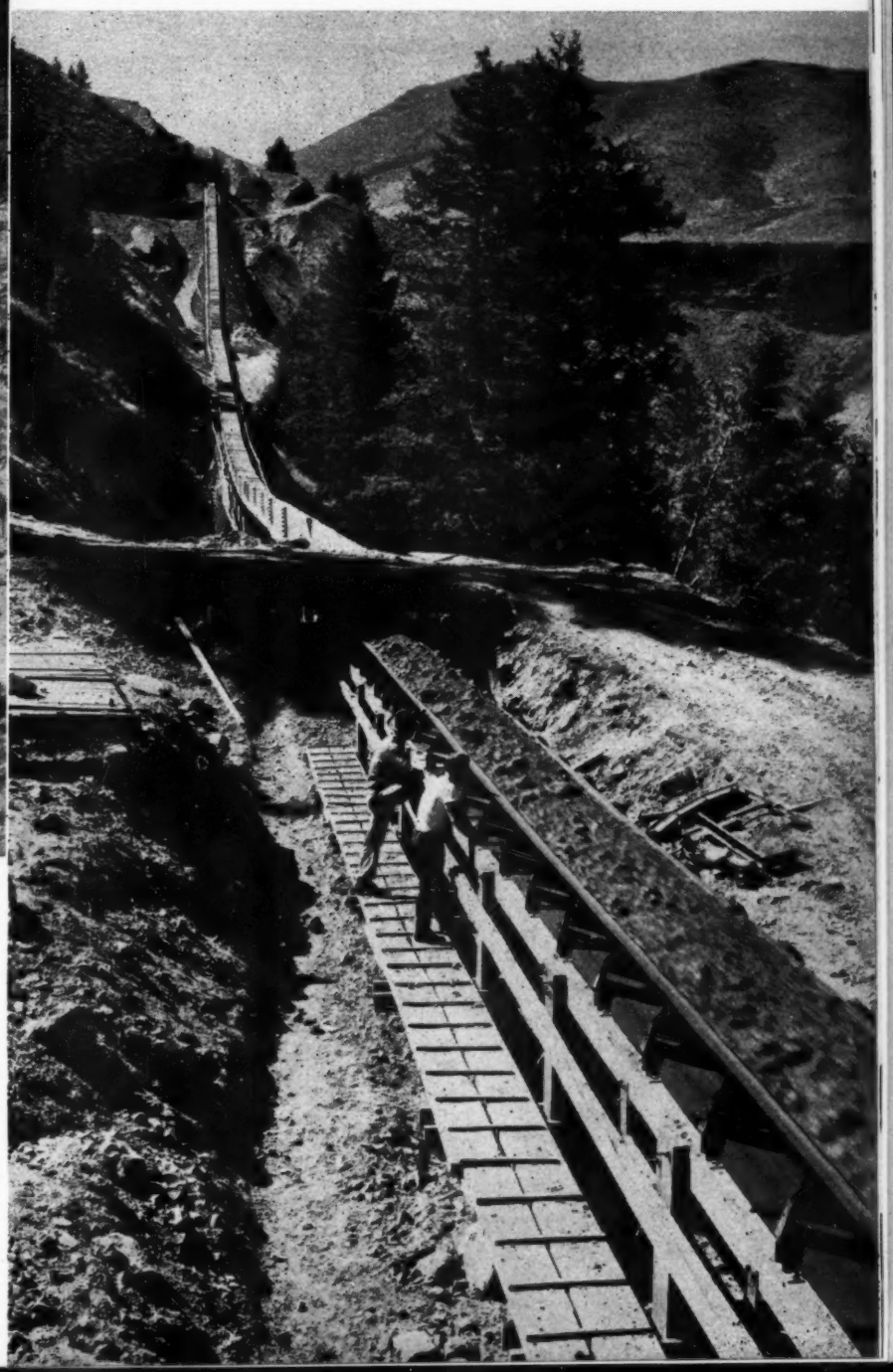
WHEN THE 17 STATES west of the 97th Meridian emerge from this war as a major factor in the nation's industrial and rural economy, projects that provide for the widest possible use of that area's natural resources will become projects of national concern in the post-war social picture.

Anderson Ranch Dam, America's highest earthfill dam and the largest earthfill structure ever built under the supervision of the Bureau of Reclamation will, when it is completed in 1946, be the key structure in a com-

son Ranch Dam

Pictures used to illustrate this article are through the courtesy of the Bureau of Reclamation.

• Left: General view of Anderson Ranch Dam from a cliff on the right side of the river showing handling of fill material. Almost the entire length of the conveyor belt system can be seen against the side of the hill in the background. Stock piles are to the left and the dam is in the lower left. Below: Looking along the 36-inch conveyor belt toward the borrow pit. The system, a mile and a half long, crosses a deep gulch just beyond the road in the center of the picture.



bination irrigation-power-flood control project which is a major unit in the plans for the development of southwestern Idaho, one of the nation's richest agricultural regions.

This dam is being built by Morrison - Shea - Twaits - Winston, a joint venture of Morrison-Knudsen Company, Inc., J. F. Shea Co., Inc., Ford J. Twaits Co. and Winston Bros. Co., on a low bid of $9,986,203. The contract was awarded on August 4, 1941, and work started three days later.

The job was shut down by a War Production Board order in December, 1942, and the project remained static

• **Loading pendulum for conveyor in borrow area with a Bucyrus-Erie 100-B shovel equipped with a 4½-cu. yd. dipper. A shovel cut has been benched along the previous excavation face to assure plenty of readily available material to keep the conveyor loaded.**

until the WPB rescinded its closing order in October, 1943, due to the importance of the project to the nation's food supply.

The structure is being built on the south fork of the Boise river, about 70 miles east of Boise, Idaho, and 42 miles upstream from Arrowrock dam. Anderson Ranch Dam will have a structural height of 444 feet and a crest length of 1,350 feet. Its volume will be 9,600,000 cubic yards and it will have a storage capacity of 500,000 acre-feet.

The body of the dam is a rolled embankment of clay, sand and gravel placed in zones as impervious, semi-pervious and pervious material. The upstream slope is faced with a three-foot layer of riprap above low water level. The downstream face is composed of a cobble and rock fill on a six-foot filter blanket of selected gravel. Two concrete cut-off walls, anchored into bedrock by footings and extending from five to 16 feet above bedrock, run the full length of the dam.

Other concreting operations on the job consist of an 1,100-foot concrete-lined spillway terminating in an outlet structure and concrete-lined spilling-basin at the river channel and a 1,500-foot concrete-lined diversion tunnel 20 feet in diameter.

Much of the original work done on the dam in late 1941 and early 1942 was to divert the river through the concrete-lined tunnel with a huge coffer dam to cut the stream off from its channel.

One foot of humus material cover-

ing the left abutment overburden was stripped by bulldozers so that the main body of overburden could be used in the dam embankment. The bulldozers stripping this humus were aided in maneuvering down the steep abutment slopes by cables from winches anchored on the roadway at the top of the abutment. After the humus material was stripped the top of the abutment was benched with bulldozers. This benching was worked down the abutment to elevations where it could be loaded by scrapers and shovels and hauled to the dam embankment or to stockpiles. Stripping was completed by sluicing the rock walls with a high-pressure water stream from a three-inch hose fed by a three-stage high pressure diesel pump.

Power shovels and hauling trailers working on two or three levels at a time handled the stripping of the right abutment. Final stripping on this abutment was also by sluicing.

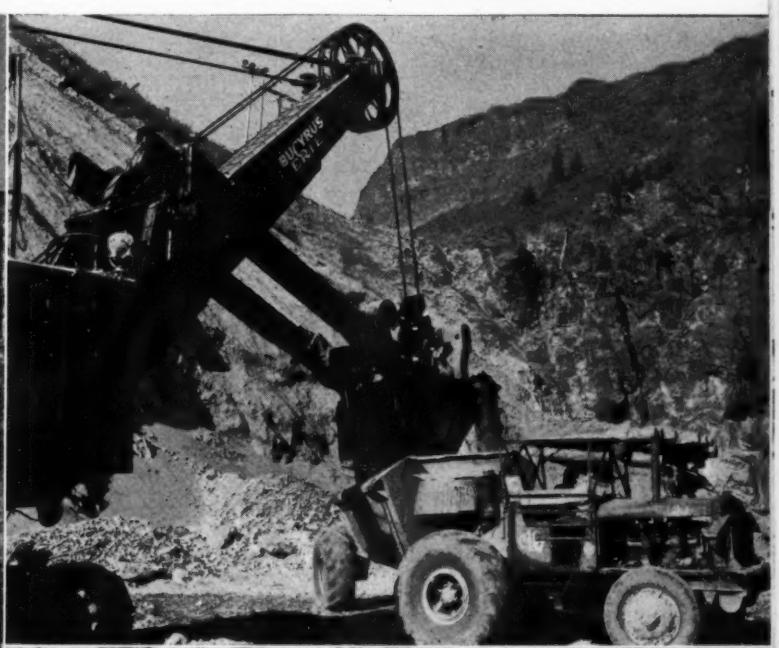
An 8,000 foot long 36-inch belt conveyor system transverses nine flights to bring millions of cubic yards of clay from the borrow pit to the dam site. The clay is loaded in the borrow pit by power shovels to two pendulum conveyors, 120′ and 200′ long, respectively, and carried on a 42″ belt to the start of the conveyor system leading to the dam site. The theoretical capacity of the system is approximately 900 cubic yards per hour.

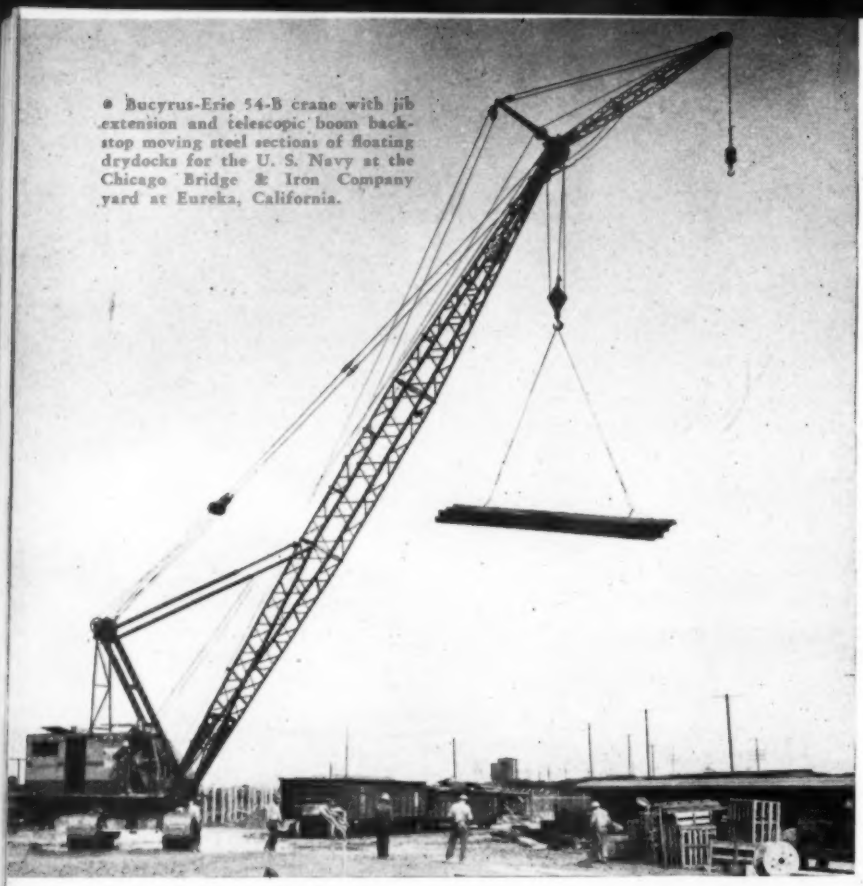
Placing the impervious fill material to build the immense clay core was started at bedrock around the secondary concrete cut-off wall on the right abutment where the river channel had been worn deeper in the bedrock. Bedrock is 120 feet below the former level of the river bed. Fill material

(Continued on page 554)

• Bucyrus-Erie 5-cu. yd. shovel loads Euclid bottom-dump trailer at fill material stockpiles. Terminus of conveyor belt system is at top of bank.

• Upper: Closeup view of shovel loading trailer at fill stockpiles. Bottom: Bucyrus-Monighan 6-cu. yd. walking dragline, Bucyrus-Erie 5-cu. yd. and Bucyrus-Erie ¾-cu. yd. draglines team up to excavate the diversion channel at Anderson Dam.





• Bucyrus-Erie 54-B crane with jib extension and telescopic boom backstop moving steel sections of floating drydocks for the U. S. Navy at the Chicago Bridge & Iron Company yard at Eureka, California.

Backward Stability

of crawler-mounted machinery

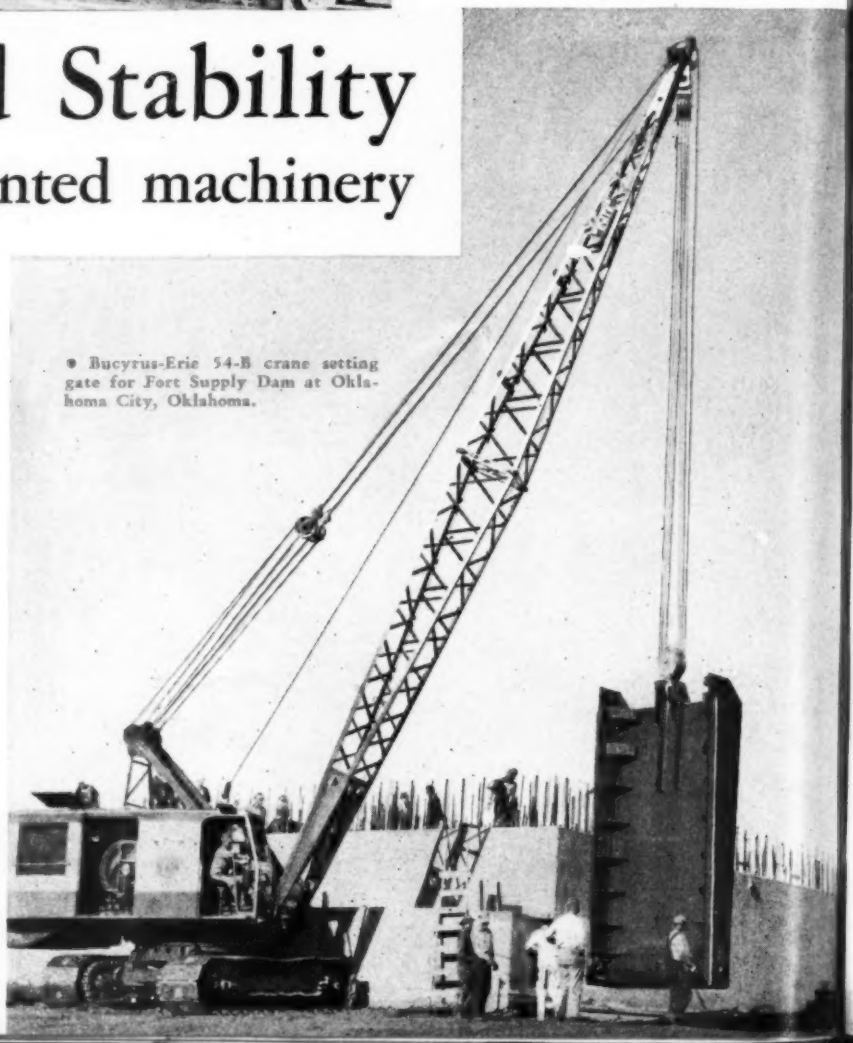
Present codes on backward stability, written primarily for railroad cranes, should be modernized to apply to crawler equipment. Suggest changes in conditions of stability specified and method of checking compliance.

By T. DAVIDSON

(Development Engineer, Bucyrus-Erie Co.)

TWO CODES HAVING reference to mobile cranes recently have come into existence. The first, "Commercial Standard CS90E-41", was issued in 1941 by the National Bureau of Standards and the second, ASA B30.2, was approved in 1943 by the American Standards Association. Neither of these codes so far has received much attention, probably because of war pressure, and the lack of competition between manufacturers and between users.

These two codes merit careful consideration by both manufacturers and users, particularly the one sponsored by the American Standards Association. It is entitled, "American Standard Safety Code for Cranes, Derricks, and Hoists." Its purpose is to serve as a guide to legislative bodies and others interested in reducing the hazards inherent in the operation of cranes. Shovels and dragline excavators specifically are exempt from this code as written, but it is unlikely that such exemptions would be retained if the code were written into state law. Although compliance today is entirely voluntary, it does not seem improb-



• Bucyrus-Erie 54-B crane setting gate for Fort Supply Dam at Oklahoma City, Oklahoma.

Note: Commercial Standard CS90E-41 can be obtained from the Superintendent of Documents, Washington, D. C., price 5 cents.

American Standard ASA B30.2—1943—can be obtained from the American Society of Mechanical Engineers, 29 West 39th Street. New York, New York.

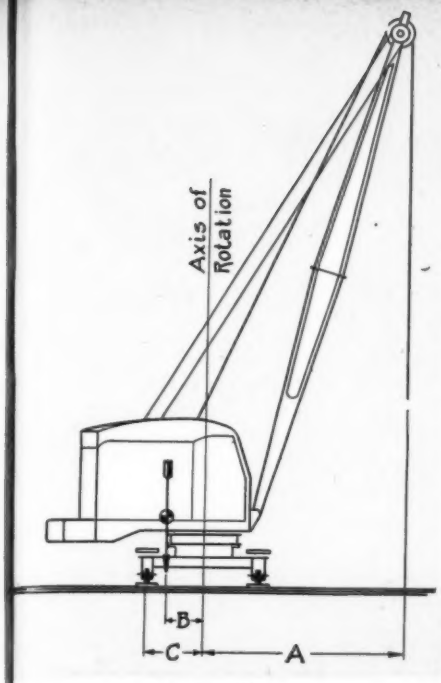


Figure 1

• Diagram of present limitation on backward stability. A — Minimum specified radius of boom. B—Distance from axis of rotation to center of gravity of complete machine. C—Radial distance from the axis of rotation to the tipping fulcrum in the least stable direction. (In this case the tipping fulcrum is taken as the outer edge of the caterpillar rollers.) B should not exceed 70% of C.

able that this code may be given a legal status similar to that of the A.S.M.E. Boiler Code.

Paragraph 31 of Commercial Standard CS90E-41 states:

"**Backward Stability**—To avoid excessive or unsafe counter-weighting of machines and to insure proper backward stability when used as a lifting crane, dragline, or clamshell excavator, the center of gravity of any crawler-mounted type machine, resting on a firm, level, and uniformly even supporting surface, in working order (cooling system full, fuel tank half full) without load, with the base rating length of boom at its minimum working radius, shall not be farther from the axis of rotation than seventy per cent (70%) of the radial distance from the axis of rotation to the tipping fulcrum in the least stable direction." Identical provisions, in different wording, are contained in paragraphs 1312b and d of the American Standards Association code. A graphical interpretation of the foregoing is shown in Figure 1.

The provision of a limit on backward instability as a precaution against turning over backward in case of an accident was started many years ago in connection with locomotive cranes, where large machines were dependent on the relatively narrow railroad gauge for a base. Although the danger is not so great with caterpillar mounting, there still is justification for some such limitation in a safety code. However, there are two objections to the limitation as written into these codes.

First, the condition specified does not represent the probable point of greatest danger. If the boom is damaged at any time it may buckle under a heavy load; if anything happens to the boom hoist or boom hoist tackle the boom may fall; or if the boom is pulled over the cab, the machine is left without any front end equipment weight. This is a less stable condition than that specified with the boom at minimum operating radius, and one of these accidents is more probable, than a condition of backward instability (uneven or soft ground) with the boom in an operating position.

Second, in many cases it will require a lot of equipment and be extremely inconvenient and costly to check a machine in the field for compliance.

The "tipping fulcrum" of a crawler-mounted machine is the center of the tumbler or sprocket when working over the ends of the crawlers. When working over the side the "tipping fulcrum" cannot be located with equal precision, but reasonably may be assumed to be at the outermost point of contact between the lower rollers and the track links. In practically all cases the latter operation over the side, will be found to be, "the least stable direction." In principle, the location of the center of gravity can be determined quite easily by putting

(Continued on page 554)

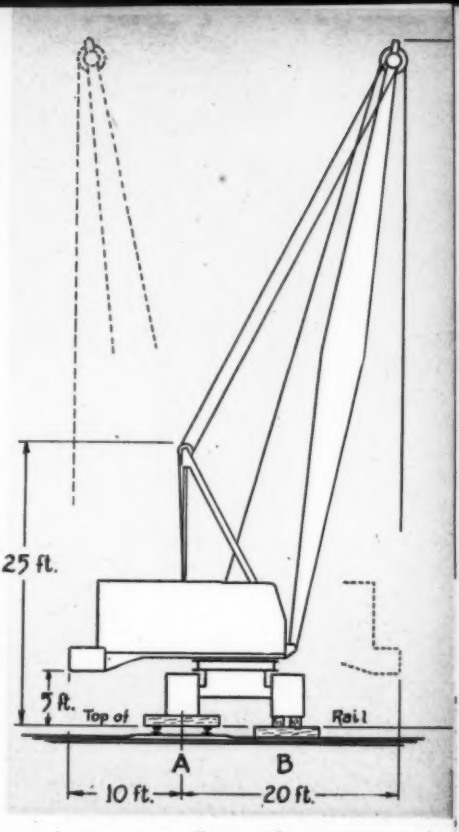
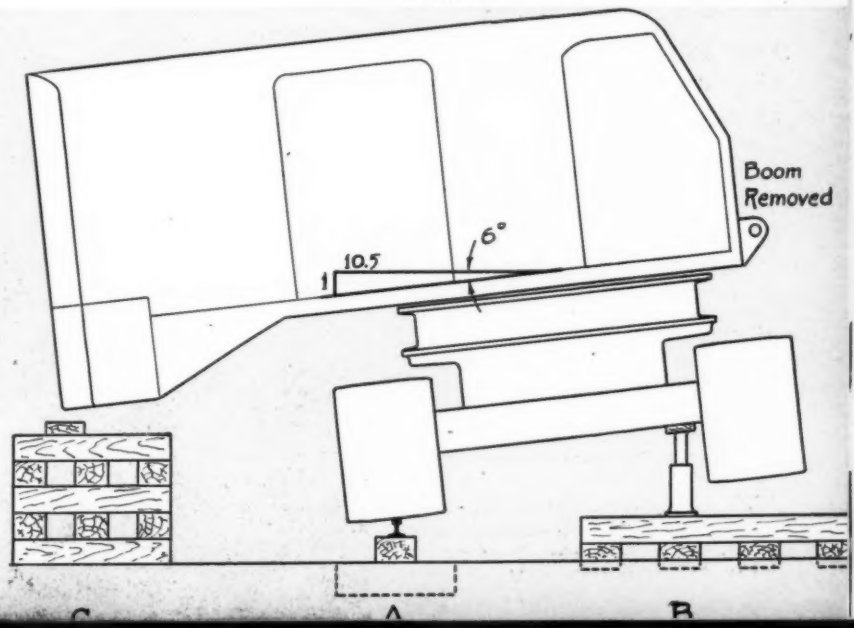


Figure 2

• Space required to weigh a 50-ton crane in the determination of its center of gravity. A—Track scale with timbers to distribute load to rails. B—Timber blocking to level machine.

• Diagram of means to check proposed limitation on backward stability. A—Rail set in line with caterpillar rollers used as tipping fulcrum. B—Jacks to lift machine. C—Cribbing to prevent tipping over backwards. Machine is acceptable if weight remains on jacks at 6° backward slope.

Figure 3



Another article on standardization of excavating equipment, "Ground Bearing Area of Excavating Equipment," by T. Davidson, was published in the September, 1944, issue of Excavating Engineer.

Army Reveals New Engineer Equipment

• The tank-dozer, now revealed in detail, is a medium Sherman tank mounted with a bulldozer blade. Fire power of the tank is not reduced and a quick release mechanism actuated from within the tank allows the blade assembly to be jettisoned in about 10 seconds. Quantity production began in December, 1943. It was successfully used in Normandy.

• New aluminum landing mats have strength comparable to steel mats at half the weight for air shipment. Runway laying speed is 250 sq. ft. per man hour.

• Above: Mule-pack 36" chain saw weighing 100 lbs. for work in areas inaccessible to motor transport. Left: Armored cabs for bulldozer tractors available in four sizes to fit various models of tractors. Particularly useful to Aviation Engineers for work in advance areas.

• Steel Treadway Bridge, M2, may be constructed on floating or fixed supports, or combination of both, for rapid stream crossings for all vehicles except a few of the largest and heaviest. Bridge roadway consists of two continuous steel channel tracks rigidly connected by steel pins at the joints. Floating spans supported on pneumatic pontoons spaced on 12' centers; fixed spans supported on prefabricated adjustable steel trestles.

All Pictures Courtesy U. S. Signal Corps.

Shots from the FIRING LINE

Establish Ceilings for Construction Services

The construction industry is now operating under a new regulation of established ceiling prices for construction services. The regulation, which went into effect August 26, fixes the price of construction work at the highest unit rate charged for the same kind of a job during March, 1942.

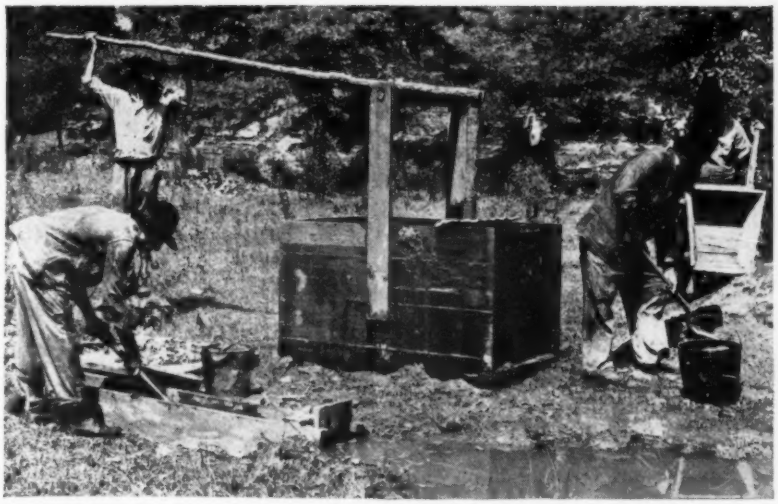
If the cost of materials has gone up since March, 1942, the contractor may add an amount to cover the increase, but this must not exceed ceiling prices. Also, increases in labor cost up to and including October 3, 1942 may be added. If higher wages are paid than those prevailing on October 3, 1942, the contractor must obtain OPA approval to add such increase to the ceiling price, unless such increase has been authorized by the Secretary of Labor under the Davis-Bacon Act, Wage Adjustment Board, National War Labor Board, or Economic Stabilization Director for the area where the work is done.

Legislation on Disposal of Surplus Property

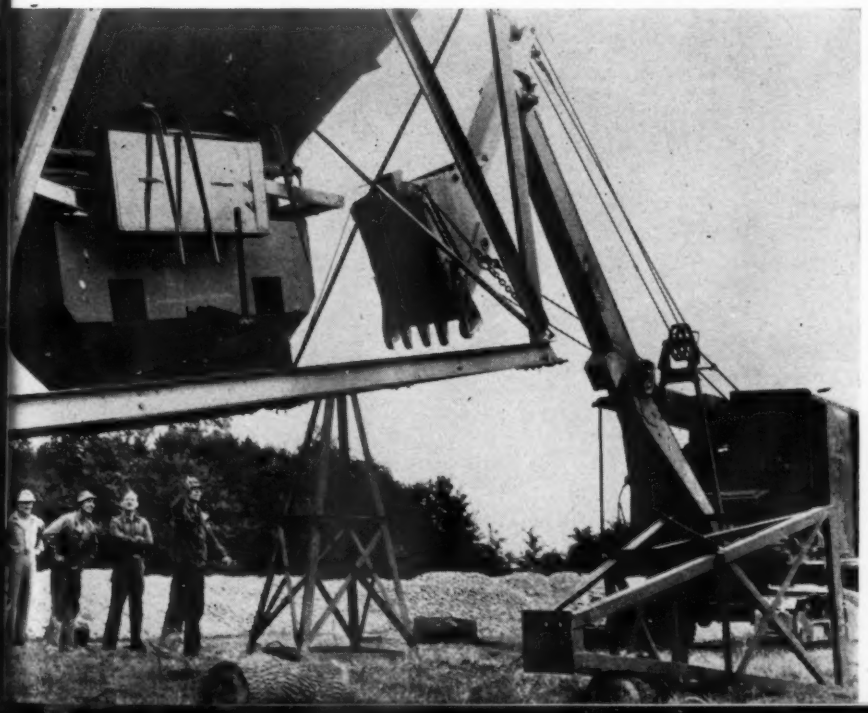
The House, on August 22, passed the Colmer Bill (H.R. 5125) setting up machinery for disposal of surplus war property. This bill is largely in line with the recommendations of W. L. Clayton, Surplus Property Administrator, and provides for the appointment of a War Property Administrator and grants him almost unlimited authority to dispose of war surpluses subject to certain policies enumerated in the bill.

Repeated efforts in the House to substitute a board for a single administrator were overwhelmingly voted down as well as numerous attempts to provide for the donation of surpluses to state agencies and educational institutions.

Three days later, on August 25, the Senate voted favorably the Stewart-Murray-Taft Bill (S 2065) which differs from the Colmer Bill in that it displaces the single administrator with an eight-man board, and provides the surplus property may be sold or leased to states and political subdivisions thereof at discounts up to 50 per cent of the market value.



• Historical scenes, such as this one of old-time lead miners, are used in Bureau of Mines motion pictures to give audiences a clearer concept of America's industrial progress. This depicts the primative method of washing and separating lead ore in Missouri with a sluice box and hand jig. In addition to modern mills, lead miners of the same region are now even using strip mine methods of mining the ore. *Bureau of Mines Photo*



• Ruston-Bucyrus 16 RB dragshovel being used in the erection of a cement batcher used by U. S. Army Engineers in building airports somewhere in England. Major A. K. Kurstedt, Richmond, Va., supervises the work.

Plans are being perfected for the immediate distribution of a large amount of construction equipment to states and political subdivisions. It is understood the Construction Machinery and Farm Equipment Section of the Surplus Property Division of the Treasury Department is putting the finishing touches on a scheme which would make construction machinery available to meet the requirements of states and local agencies of government.

German Equipment Used in Repair of Cherbourg

Progress in the repair of the port of Cherbourg, key to the Allied supply system, is being speeded by U. S. Engineer Port Construction and Repair Groups using materials and machinery with which the Germans hoped to halt such progress. U. S. Army Engineers are today working with explosives planted at various key points in the port area by retreating Nazis, rebuilding the demolished docks and quays with German materials and, adding insult to injury, are using German concrete mixers, shovels and cranes to help get the job done.

One of the biggest jobs facing the

Engineers, once the debris was cleared from the port area and an estimate of the damage could be made, was the filling in of a huge quay face where a great number of cargo vessels could be berthed once the damage done by Nazi demolitionists was repaired.

With captured explosives removed, the Engineers utilized square concrete blocks in facing the blown-out sections of the quay. The fill was then made with broken-up, concrete German tank obstacles, found in great quantities in Cherbourg at strategic points and in even greater quantities in a warehouse in the city. To this was added the debris from blown-up buildings and over it all was poured concrete mixed in captured concrete mixers and hauled in captured German trucks as well as our own.

Even the concrete used on the unloading platform was a gift of the unwilling German High Command. It was concrete the Nazis had stored for use on their gigantic rocket launching platform in process of being built in this sector when captured. It took approximately a day for American troops to re-paint the German trucks captured at the same site and throughout this area and put them in condition and, within twenty-four hours, they were put back to work hauling the concrete to the port area reversing the Nazi procedure.

Hardly an Engineer regiment in the Cherbourg area is using less than three German power shovels, a crane or two and a whole fleet of captured trucks in their operations. Much of the explosives in use by U. S. Army troops up to now have also been donated to the cause by the unwilling Nazis. One Port Repair unit, busy preparing an exit for amphibious trucks, relied almost entirely upon booty in performance of its mission. De-loused Nazi Tellermines, dug out of the roads and from in front of German fortifications, were used as charges to blast away sections of the sea-wall through which trucks would pass. Concrete roadways utilized concrete picked up at the same rocket bases and Jerry, in the haste of his departure, left behind the portable lumber forms in which the concrete was formed.

As a matter of fact, the rocket bases are proving of inestimable value in the quick repair of the port. The form lumber—a scarce item in both England and France—which is now being used in the reconstruction of docks and other port facilities where concrete must be poured, came in large part from these bases. Engineers stripped it from the rocket base forms and brought it to this port. The rocket bases also proved to be a rich source of scarce piling, vital in dock construction. The camouflage nets suspended over the bases hung from great piles which were taken up and are even now being driven into new dock construction.

German pipe, valves and fittings are also being freely used in repairing the water system and in petroleum installations here. German railroad ties and rails are being used to augment the present rail lines about the port in preparation for the heaviest cargo unloading operations that Cherbourg, even in normal times, has ever witnessed. Steel cable, another vital item in heavy construction work, was found here in large quantities and is now doing duty against its makers.

7 YEARS WITHOUT A BREAKDOWN OR MACHINE REPAIR

Behind this letter is the all-out performance of a General Excavator which has been in all-around municipal service since 1937 . . . with the first repair part yet to be purchased! Here is strong basis for including GENERAL-built equipment in your postwar plans.

GENERAL

Mr. George W. Brown,
Town Superintendent,
Walworth, New York.

Dear Mr. Brown:

Just a few lines to thank you for writing.

It is gratifying to note that you have yet to buy your first actual repair parts for your General Excavator, particularly since this machine was shipped more than 7 years ago. Most folks would expect that a machine of that age, and with the service it has given, would be pretty well worn out — or would have required thousands of dollars in repair expenditures.

In all modesty, Mr. Brown, we do take pride in the way Generals can "dish it out" and "take it," and here's hoping you continue to have the best of luck with your machine. Here too, incidentally, is our promise that after the war, Generals will be better than ever!

Cordially,

THE GENERAL EXCAVATOR COMPANY,

Don B. Smith, Sales Manager

DBS/fb

GEORGE W. BROWN
Town Superintendent
Walworth, N. Y.

. . . *"during national emergency I've personally operated and cared for this General Excavator . . . surprised to find so rugged a machine so easy to handle and keep adjusted . . . in addition to loading bank-run gravel, we use it on tough highway widening jobs—uprooting trees, breaking hard-pan rock . . . yet to encounter job too tough for The General."*

And Watch The GENERAL "TYPE 10"
the revolutionary Machine of Tomorrow,
when the swing is to postwar business. Crane-shovel-dragline all in one, this advanced design rubber-tired, one-man, one-engine rig will give you a new lease on profit opportunities in your territory. Write for the details today!

THE OSGOOD COMPANY
SHOVELS, DRAGLINES CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

Associated with The Osgood Company

GENERAL EXCAVATOR CO.
MARION, OHIO

GENERAL
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

1945 ARBA Meeting

"Action", is the theme of the 42nd Annual Meeting of the American Road Builders' Association to be held at the Stevens Hotel, Chicago, January 16-19, 1945. Plans for launching the greatest highway program in the history of the nation will be aired from every angle with outstanding authorities from government and industry participating.

Dodge Promotes Campaign to Place Designing Orders Now

In an effort to actuate those in a position to do so, to place designing orders now for construction to be built after the war, F. W. Dodge Corporation is promoting the use of the slogan, "Blueprint for Tomorrow's Needs Now!"

In announcing his company's backing of the campaign, Thomas S. Holden, president of the Dodge corporation, pointed out that the construction industry, because of its flexibility of organization and a vast deferred demand awaiting the release of critical ma-

Power...

precedes progress

P

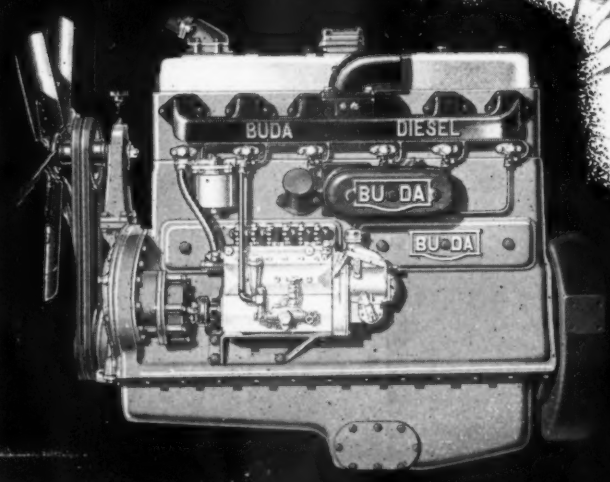
roduction of Flour Mills in the 18th century was limited to the local power available.

Today you can have the finest, most modern, efficient power ever developed, by specifying BUDA Diesel Engines.

Write or wire for literature.

Bettman Archive

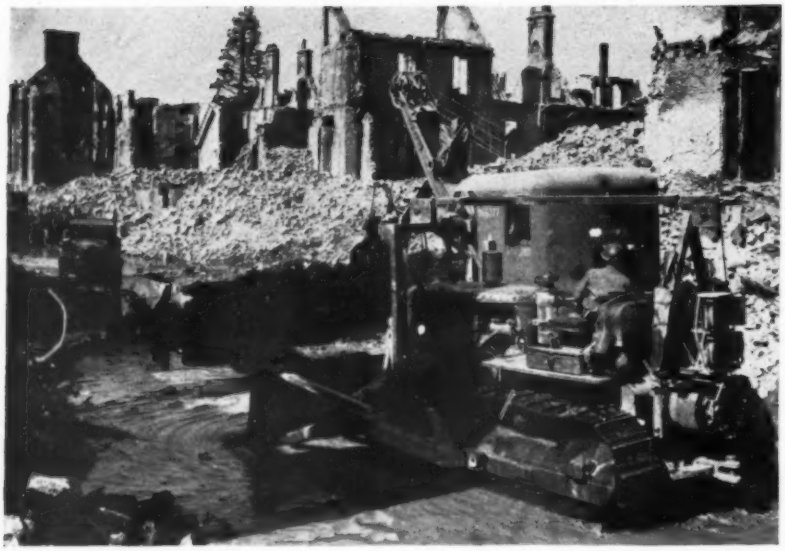
Flour Mill — 16th Century



BUDA
Service is Nation-Wide

BUDA

HARVEY (Chicago Suburb) ILLINOIS



• Army engineers team up LeTourneau bulldozer and Osgood shovel to clean up Valognes, France, after the Allied bombing and shelling on Cherbourg.
U. S. Signal Corps Photo

terials, will probably be able to absorb man power demobilized from the armed forces and war plants faster than any other line of business, commerce or industry.

"Nearly everyone agrees," Holden said, "that the biggest job facing the country once victory is ours is to get servicemen and war workers back to productive work within the framework of our system of private enterprise.

"Less than half of the jobs planned for V Day are in the design stage. The time to design the projects is now so that they will be ready for construction when the manpower and materials are ready for employment.

"By planning now, the period of transition from a war to peace economy will be shortened: the shorter the period of transition, the lower governmental costs, but more important — placing our demobilized servicemen in gainful employment will serve to bring about quickly their adjustment to a normal way of life."

The slogan and sticker design being used in the campaign were originated by E. O. Filby, a consulting engineer of Kansas City, Missouri, for the use of the Committee on Water and Sewage Works Development of four associations, namely, New England Water Works Association, Federation of Sewage Works Associations, American Water Works Association, and Water and Sewage Works Manufacturers Association. The Committee, however, grants permission for use of the slogan and stickers by others interested in promoting early construction revival with the proviso that no person or firm buy the sticker for resale at a profit. Stickers or electros may be ordered through the Hibbert Printing Company, 9th Ewing St., Trenton 7, N. J.

Dispose of 70,000 Tires Declared Surplus by Army

A unique plan of redistribution of surplus tires now being used by the Office of Surplus Property, Treasury Procurement Division, was made public by Ernest L. Olrich, Assistant to the Secretary of the Treasury.

The plan provides for national distribution and has just been tested in

WELLMAN WILLIAMS TYPE BUCKETS

BUCKET QUALITY BACKED BY TWO FAMOUS NAMES

Williams Buckets have been famous for nearly 40 years for their many mechanical features.

Since 1931, Williams Buckets have been built by Wellman, known for many great engineering achievements in the heavy iron-ore, coal, and steel industries. The welded construction which featured Wellman custom-built buckets for extra heavy steel mill service, is now used in all

Wellman-Williams Buckets FOR LONGER SERVICE WITH LESS MAINTENANCE COST — Built in Multiple Rope, Power Arm, and Power Wheel Types in ⅜ yd. to 16½ yd. capacities.

The Wellman Engineering Company
7002 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

Send for Free Bulletin
Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

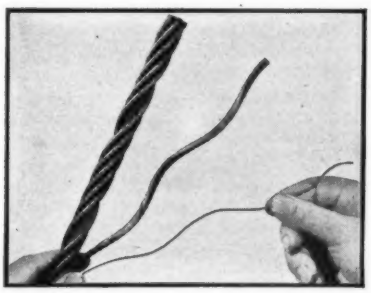
"What can Macwhyte PREformed Wire Rope do for Me?"

Here are specific ways you benefit from the use of Macwhyte PREformed wire rope.

First, you get longer wire rope service for 3 reasons:

1. PREformed has less internal fatigue.
2. PREformed has less internal friction.
3. PREformed has better balance.

Each wire and each strand are PREformed before being laid into the finished rope. The detrimental effects of internal friction and in-



ternal fatigue, two of wire rope's greatest destroyers, are reduced to a minimum in Macwhyte PREformed. There is perfect balance. Each strand and wire carries its share of the load.

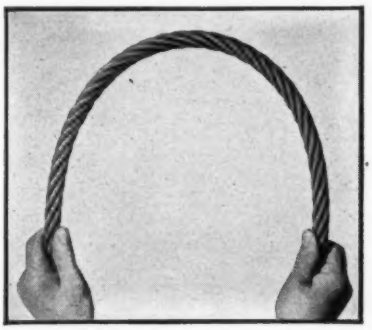
Second, you get lower cost per load carried.

In Macwhyte PREformed, every strand in the wire rope is under uniform tension. There is no "early wearing out" of some strands while the others "loaf." This perfect balance makes possible lower cost per load carried on the job.

Third, you get fewer shut-downs, less trouble.

Fewer shut-downs are the rule, because PREformed lasts longer. In these times, lost man hours due to repairs or replacements can be disastrous. PREformed helps prevent this.

Less trouble is encountered be-



cause PREformed is flexible, easy to handle. The perfect balance of strands means that PREformed is kink-resistant, very easy to take off the reel and put on your equipment.

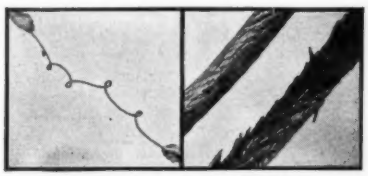


Figure A *Figure B*

Fourth, you have less chance of rope loss or workman injuries.

Macwhyte PREformed is not likely to curl up *(Figure A)* during unreeling and installing. Therefore, the risk of kinking and permanently damaging the rope is greatly diminished.

Nor does PREformed wire rope wicker and become dangerous to handle *(Figure B)*. A wire broken from wear in a PREformed rope lies in place, does not wicker out to injure workmen's hands.

In addition to these 4 specific benefits, add this 5th: Macwhyte Internal Lubrication that goes around every wire in every strand of Macwhyte PREformed wire rope.

Inside bearing surfaces of wires are thus protected against friction and corrosion. All spaces between

wires are filled with lubricant to keep out moisture and resist ordinary acids. This tenacious, heavy lubricant Macwhyte uses, clings to wires unaffected by the hottest, coldest, driest, or most humid temperatures.

Macwhyte engineering experience may help you. Tell us your problem. We'll assist you in getting the *correct* rope for your equipment.

MACWHYTE PREformed WIRE ROPE

Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

WD. 754

MACWHYTE COMPANY

ARMY E NAVY

Wire Rope Manufacturers

2903 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

• **Bucyrus-Erie Bullgrader being used to clear a path through the jungle in the Southwest Pacific.**
Official U. S. Navy Photograph

the disposal of 70,000 tires declared surplus by the Army. A group of 25,000 new and 31,000 used small truck tires were sold back to 23 of the 26 tire manufacturers in the U. S., each receiving an allotment based on their usual replacement business. These manufacturers will in turn pass them on to regular distributors, thus assuring a wide distribution. This plan will be followed by the Automotive Division of the Office of Surplus Property as other tires become available as surplus.

All tires are being sold under existing regulations of the Office of Defense Transportation, the Office of Price Administration and the Rubber Director's Office.

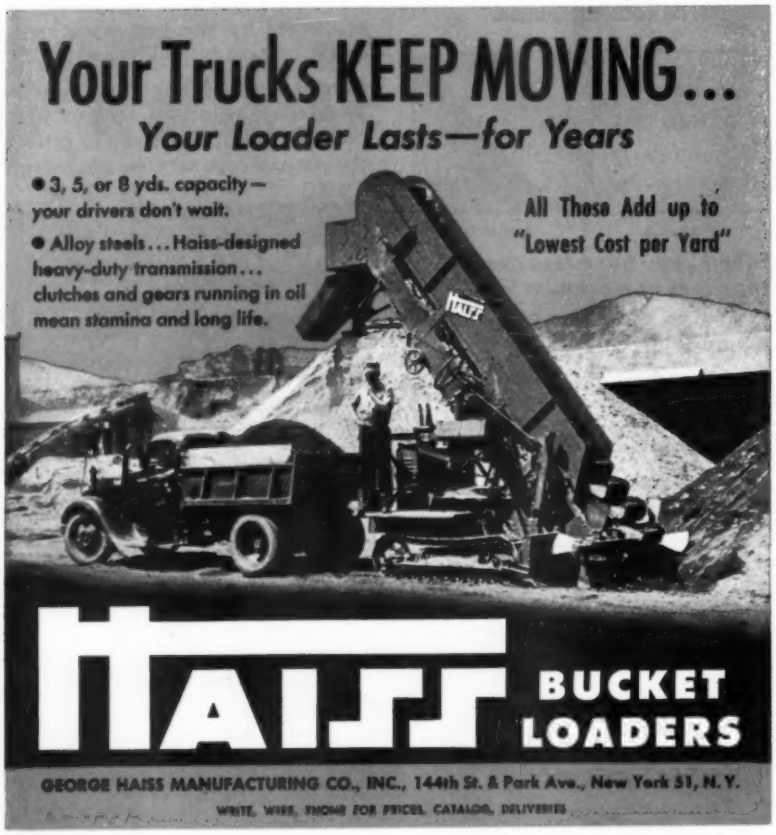
There is no immediate prospect of surplus tires in larger sizes as there is still critical military need for them.

Ixtapantongo Project First of Valle del Bravo Development

The Ixtapantongo hydroelectric project of the Comision Federal de Electricided is the first and major step in the development of the great water power resources of the Valle del Bravo basin near the western border of the state of Mexico, about 120 km west of Mexico City. Of the total of 175,000 KW ultimately to be produced in this area in three plants, the Ixtapantongo plant is designed to provide 85,000 KW.

The overall Valle del Bravo development contemplates the following constructions:

1. Earthfill dam on Rio Malacatapec to create a 200,000,000 cubic meter capacity reservoir in Valle Victoria.
2. Earthfill dam on Rio Valle del Bravo to create a 400,000,000 cubic meter capacity reservoir in Valle del Bravo.
3. Canal and tunnel to connect Valle Victoria reservoir to Valle del Bravo reservoir.
4. Tunnel from Valle del Bravo dam to Durazno, approximately 3.3 Kms. long.
5. Durazno power plant, approximately 25,000 KW, utilizing 140 meter head between Valle del Bravo dam (Km. 2) and this point (Km. 8).
6. Concrete diversion dam at Km. 8 (Durazno) for Ixtapantongo.
7. Canal and tunnel approximately 3.2 kms. total length from Durazno to Colorines.
8. Earthfill dam across Colorines River to create 4,000,000 cubic meter regulating pond.
9. Pressure tunnel approximately 720 meters long to connect Colorines regulating pond to top of Ixtapantongo penstocks.
10. Ixtapantongo power plant approximately 85,000 KW utilizing 330 meter head between Durazno (Km. 8) and this point (Km. 13).
11. Concrete diversion dam at Km. 13 (Ixtapantongo) for Santa Barbara.
12. Two section tunnel approximately 5 kms. total length from Ixtapantongo to top of Santa Barbara penstocks.
13. Santa Barbara power plant, approximately 65,000 KW, utilizing


Your Trucks KEEP MOVING...
Your Loader Lasts—for Years
• 3, 5, or 8 yds. capacity—your drivers don't wait.
• Alloy steels... Haiss-designed heavy-duty transmission... clutches and gears running in oil mean stamina and long life.
All These Add up to "Lowest Cost per Yard"
HAISS
BUCKET LOADERS
GEORGE HAISS MANUFACTURING CO., INC., 144th St. & Park Ave., New York 51, N. Y.
WRITE, WIRE, PHONE FOR PRICES, CATALOG, DELIVERIES

PLAN NOW TO REPLACE

Obsolete Equipment

WITH THE FASTER POWER OF TOURNAPULLS

YOU'LL GET MORE POWER FOR DIRTMOVING . . . LUG LESS DEADWEIGHT . . . WORK FASTER

Tournapulls are designed and built for earthmovers by earthmovers with years of experience on actual earthmoving jobs. They know that speed and stoutness pay. You get both in Tournapulls.

Tournapulls move more dirt . . . move it faster and cheaper . . . because their working weight compared to power and capacity is much less than slower, track-type outfits—

Prime Mover and Equipment	Super C Tournapull & 15-Yd. Carryall	Tractor & 15-Yd. Scraper Approx.
Weight of Combined Units	31,000 #	53,500 #
Lbs. of Weight per Horsepower	207	411

Note that this difference in weight is the equivalent of 7.5 pay yards. Can you afford to lug that much deadweight back and forth on a 10,000-hour working life when you could be moving pay dirt with a Tournapull?

BIG TIRES REDUCE MAINTENANCE

Note, too, that the Tournapull has 150 brake horsepower for its working weight of 31,000—plus the flotation of big drive tires (21 x 24). These large tires give you plenty of traction with a minimum of wearing parts . . . also cushion the equipment against shock and reduce operator fatigue.

NO CHANGE IN OPERATING METHODS

With Tournapulls you use the same time-tested LeTourneau operating methods that have proved so successful with tractor-scraper outfits—downhill loading, pushers for big-capacity scrapers, working cuts and fills in series, etc. But Tournapull speed enables you to complete round trips in ⅓ to ½ the time.

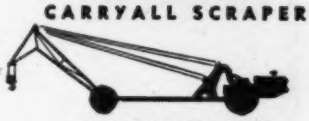
Why use slow-moving, overweight equipment, when you can have faster-moving, job-proved Tournapulls? You'll pay less, move more yardage . . . more profitably. Plan NOW to replace obsolete equipment with faster powered Tournapulls.

Only *TOURNAPULLS* Give You This Interchangeability

Cable control, with the job-proved LeTourneau Power Control Unit, makes possible these cost-cutting combinations—all with the same Tournapull prime mover.

TOURNAPULL PRIME MOVER

CARRYALL SCRAPER



TOURNACRANE

TOURNATRAILER

Write today for this "Postwar Equipment Folder". Tells what to look for and why in selecting future construction units. Address your request to Dept. EE-1044 R. G. LeTourneau, Inc., Peoria, Ill.

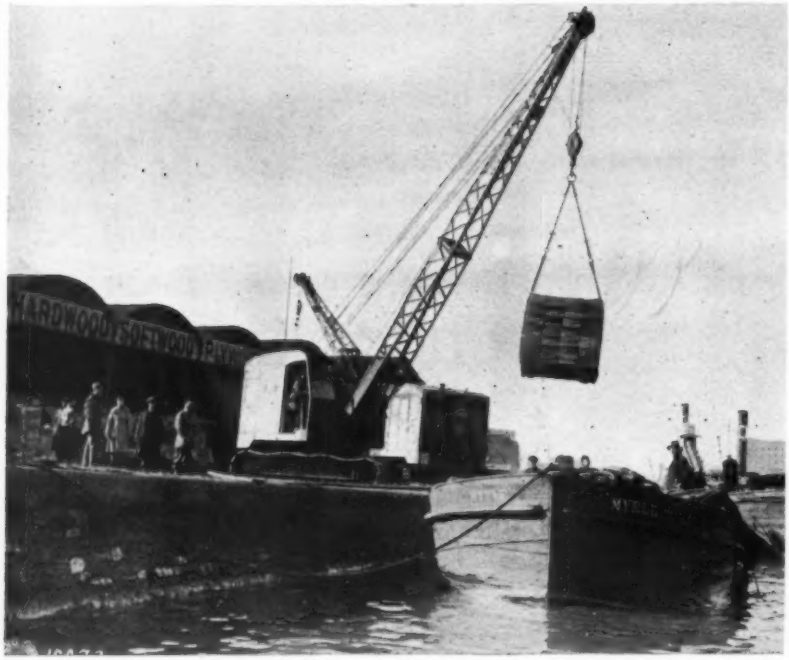
LETOURNEAU PEORIA, ILLINOIS · STOCKTON, CALIFORNIA **TOURNAPULLS**

JOB-PROVED 2200 Built and Shipped

Manufacturers of TOURNAPULLS*, DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

*Trade Mark Reg. U. S. Pat. Off.

RUBBER-TIRED POWER FOR FASTER EARTHMOVING



• **Bucyrus-Erie 22-B crane loading Army food rations from a dock somewhere in England.**
U. S. Army Signal Corps Photo

250 meter head between Ixtapantongo (km. 13) and this point (Km. 19).

14. High voltage transmission lines between these power plants and to Mexico City.

The Ixtapantongo power plant and associated works was chosen as the initial step in this grand project not only because it is the major element of it, but also because its very favorable topographical conditions made it an extremely inexpensive power development.

Ragsdale Promoted

Theron W. Ragsdale, formerly chief of the construction and operations division, in the U. S. Army Engineers office, Portland, Oregon, has been promoted to executive assistant to the district engineer, Col. Ralph A. Tudor. Robert E. Hickson succeeded Ragsdale.

Maine Votes Against Diverting Road Funds

An avalanche of "yes" votes at the state elections placed Main fifteenth in the list of states which have adopted constitutional amendments preventing diversion of motor revenues to non-highway purposes, according to the American Road Builders' Association.

In addition to Maine, these states have protected their highway funds: Minnesota, Kansas, Missouri, Colorado, California, Michigan, New Hampshire, Idaho, Nevada, North Dakota, South Dakota, Iowa, Oregon and West Virginia.

Missouri Group Favors Anti-Diversion Law

By BETHUNE JONES

Missouri's State Constitutional Convention voted August 23 to continue the provision in that state's present basic law restricting the use of state gasoline taxes and motor vehicle registration fees to highway purposes.

At the same time the convention approved proposed far-reaching grants of authority to the State Highway Commission to carry out a vast program of highway improvement, development and extension after the war.

With the exception of giving the state legislature a check on the State Highway Commission in the construction, reconstruction and establishment of limited access to and from state highways, the convention upheld the recommendations of its highway committee and rejected proposals to hamper or restrict the future operations of the Highway Department by making it subservient to the legislature or local officials in its major work.

Going far beyond present law in conferring authority upon the commission, the proposals approved by the convention are based largely upon the assumption that there will be a huge postwar road building and development program in Missouri and that the commission should have a free hand to cooperate with the federal government, which is expected to finance a major portion of the program.

Among the most important changes favored for adoption in the proposed new constitution is authority for use of highway funds in the acquisition,

THESE LINN HALFTRAKS

Two of a fleet, haul 8 tons of asbestos rock over rough terrain and 3,000 feet of 25 percent grade.

THE LINN MANUFACTURING CORPORATION, MORRIS, N. Y.

PLAN YOUR PLANT DRIVE NOW!

Good organization will be needed to sell the 6th. The task of raising the huge sum required will be the most difficult ever asked of Industry. As each new military success brings us closer to Victory, the public naturally will feel that the urgency of war financing is lessened—whereas it isn't. So organize now to prevent a letdown on the home-front from causing a letdown on the fighting front. Build your plant's payroll campaign around this fighting 8-Point Plan. You don't have to wait for the official Drive to start—swing into action NOW!

1 **BOND COMMITTEE**—Appoint a 6th War Loan Bond Committee from labor, management and each representative group of the firm.

2 **TEAM CAPTAINS**—Select a team captain, for each 10 workers, from men and women on the payroll—but not in a supervisory capacity. Returned veterans make most effective captains.

3 **QUOTA**—Set a quota for each department and each employee.

4 **MEETING OF CAPTAINS**—Give a powerful presentation of the importance of the work assigned to them. Instruct them in sales procedure. Have them carefully study the Treasury Booklet, *Getting the Order.*

5 **ASSIGNMENTS**—Assign responsibilities for:

(a) *Music, speeches and announcements of the opening rally.*
(b) *Pre-drive letter to employees from management and labor.*
(c) *Competitive progress boards.*
(d) *Meeting schedules, etc.*

6 **CARD FOR EACH WORKER**—Dignify each personal approach with a pledge, order, or authorization card made out in the name of each worker. Provide for a cash purchase or installment pledge. Instruct each captain to put a pencil notation on the card to indicate the subscription he expects to solicit from each worker.

7 **RESOLICITATION**—People don't mind being asked to buy more than once. Resolicit each employee toward the end of the drive in a fast mop-up campaign. Call upon your State Payroll Chairman; he's ready with a fully detailed plan—NOW!

8 **ADVERTISE THE DRIVE**—Use all possible space in the regular media you employ to tell the War Bond story.

The Treasury Department acknowledges with appreciation the publication of this message by

Excavating Engineer

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council

• Stripping operations over an abandoned coal mine of the Berlin Coal Company of Greensburg, Pa., were started the first of this year by Frank Mashuda Company of Milwaukee, Wis. A road contractor in normal times, Mashuda is using four LeTourneau Carryalls equipped with Goodyear tires in this war-time operation near West Lebanon, Pa.

Top: One of the Carryalls and a tractor after they partially crashed through the top of the abandoned mine. Left: The cave-in of the mine roof after a scraper was moved out. This hole was filled with dirt before a tractor pulled out the bulldozer still caught in the cave-in.

construction and maintenance of highways within the corporate limits of cities as a continuation of any federal or state highway, or any connection with a federal or state highway through cities and towns. Missouri's present law prohibits the use of state road funds within any city or town of more than 2,500 population—a provision which would impede state participation in the contemplated federal postwar highway program.

The convention also authorized the commission to construct and maintain additional state highways, bridges and tunnels to relieve traffic congestion outside the corporate limits of all cities having a population of more than 150,000.

To permit development of the state's natural scenic advantages, the convention voted to permit the commission to construct and maintain highways and bridges to and through the state parks, public areas and reservations and connect them with the state highway system. The commission also would have authority to develop national, state or local parkways, travelways and tourways with coordinated facilities. In this connection it was contemplated that the federal government may aid in financing such projects as scenic drives along the Mississippi and Missouri Rivers, and that the state should be in a position to do its share.

Also voted by the convention was a change in the present allocation of funds for far-to-market roads, under which some counties now get more than they need and others less. The present apportionment is on a basis of 50 per cent in the ratio that the area of each county bears to the area of the state and 50 per cent in the ratio of the population of each county to the population of the state. Under the proposed new formula, one-fourth of the funds would be allocated on an area basis, one-fourth on a population basis, and the remaining 50 per cent would be expended in the discretion of the highway commission.

Award Million in Contracts On Conchas Canal Work

Contracts totaling over a million dollars have been awarded to low bidders J. A. Terteling and Sons, Inc., of Boise, and Clyde W. Wood, Inc., of Los Angeles, for continuation of the construction of the Conchas Canal to bring water to the Tucumcari Reclamation project in northwestern New Mexico, it was announced by Harry W. Bashore, Commissioner of Reclamation of the Department of the Interior.

Work on the Tucumcari project, halted in 1942, is being resumed under the war food program to supply irrigation service to 17,000 acres of productive land. Ultimately, 45,000 acres of land in Quay County, New Mexico, will be served by the project.

J. A. Terteling and Sons, Inc., was awarded the contract amounting to $563,441 to construct three sections of the Conchas Canal and Clyde W. Wood, Inc., a contract for $686,248 to construct five other sections of the earthwork and canal structures.

The main canal will have an initial capacity of 700 feet per second for a length of 50 miles below the reservoir and then be reduced to 96 feet per second in the remaining 17 miles, because of canal and lateral diversions. The Hudson, a branch canal, will be constructed to serve the northeastern areas, and smaller laterals will distribute water to the farm units of the Tucumcari project.

The water supply through the canal will come from the Conchas Reservoir, which controls 7,310 square miles of the South Canadian drainage area extending northwesterly into the high

SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!
ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

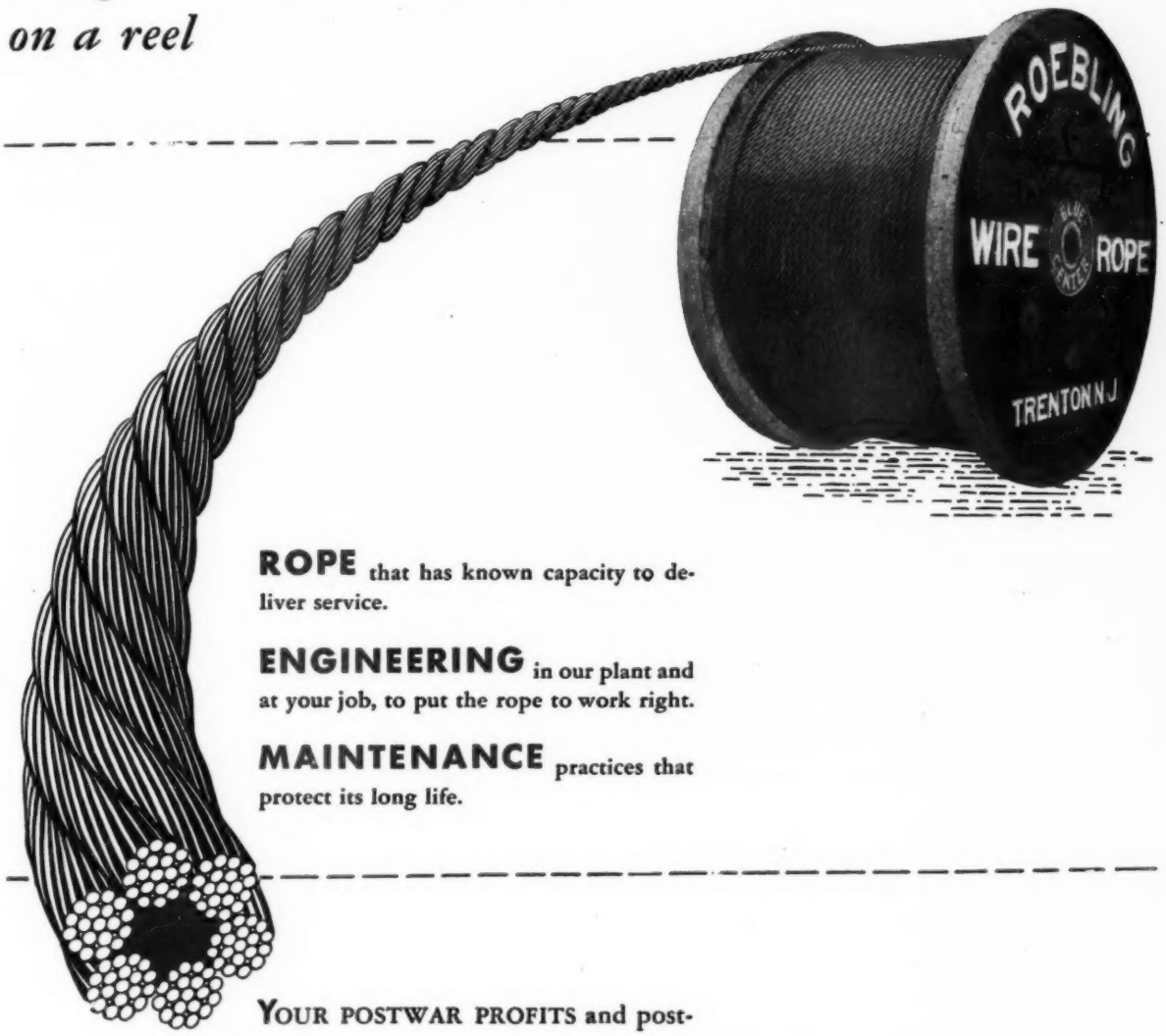
on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.

EXPERIENCE builds 'em PERFORMANCE sells 'em.

When you say, **"Make it ROEBLING**
'Blue Center'" *you buy a lot of things that can't be wound on a reel*



ROPE that has known capacity to deliver service.

ENGINEERING in our plant and at your job, to put the rope to work right.

MAINTENANCE practices that protect its long life.

YOUR POSTWAR PROFITS and postwar jobs will depend in part on operating rope-rigged equipment at lowest possible cost. You can leave that part to Roebling.

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PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • COLD ROLLED STRIP • SUSPENSION BRIDGES AND CABLES • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS ELECTRICAL WIRES AND CABLES • ROUND AND SHAPED WIRE • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS WIRE CLOTH AND NETTING

• A Baker Gradebuilder and Allis-Chalmers tractor, behind the truck in the foreground, is among equipment being unloaded onto Italian beach from landing boats. Gasoline drums are wedged behind the Gradebuilder blade.
U. S. Army Signal Corps Photo

Sangre de Cristo Mountains. Conchas Dam is located in San Miguel County, approximately 35 miles northwest from Tucumcari, and approximately a quarter mile below the confluence of Conchas River with the South Canadian River.

The dam and reservoir, authorized by the Flood Control Act of 1936, were built by the Corps of Engineers of the United States Army with Emergency Relief Appropriation funds for immediate flood control benefits to the states of New Mexico, Texas, and Oklahoma, and for future irrigation.

The reservoir capacity of 600,000 acre-feet is apportioned between flood control and irrigation. One hundred thousand acre-feet of the 600,000 acre-feet are reserved for dead storage storage. An agreement has been made between the Army Engineers and the Bureau of Reclamation for the operation of the reservoir, for the multiple-purpose uses of flood control, and irrigation.

Accurate Results Found in Adams Tunnel Bores

Surveys by engineers of the Interior Department's Bureau of Reclamation for the 13-mile Alva B. Adams Tunnel under the Continental Divide were so accurate that the two-way bores were holed through within a fraction of an inch of each other.

This was disclosed by Reclamation Commissioner Harry W. Bashore after receiving a report on the final survey of this longest tunnel ever to be driven from two points of access. The tunnel was constructed to carry irrigation water to the eastern slope of the Divide in Colorado.

"The checkup shows that the alignment of the two sections of the tunnel coincided within 7/16 of an inch, and the tunnel grades met within ¾ of an inch," said Commissioner Bashore.

To achieve these precise results, Reclamation engineers, working under all weather conditions, carried their surveys over the main range of the Rockies. They located their control (triangulation) stations on some of the highest peaks—Mt. Craig, Hagues Peak, and others, some towering more than 13,000 feet above sea level.

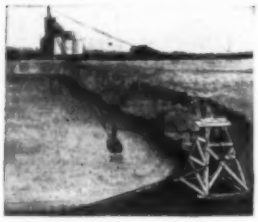
The surveyor's monument set on the Continental Divide above Andrews Glacier was the only one engineers could reach by horseback travel. Although the point did not require laborious packing by manpower, it was the most difficult for instrument work. Whistling gales in this high pass between Otis and Taylor Peaks often delayed the survey work because the precise instruments employed could not be used except during infrequent periods of calm air and clear weather.

Authorization for the Bureau of Reclamation to construct the tunnel was granted June 1940, but work was stopped December 31, 1942, by order of the War Production Board. Work was resumed on the west end on August 24, 1943, and on the east section, September 17, 1943, when a modified construction schedule was cleared as a part of the war food program of the Bureau of Reclamation.

Two construction companies, the S. S. Magoffin, working uphill from the east portal and the Stieres Company, driving downhill from the west end, holed through on June 10 of this year.

(Continued on page 540)

Costs Reduced
. . . ON TOUGH EXCAVATING JOBS



Sauerman Slackline Cableway digs gravel and hauls to top of screening plant at cost of 4c per cubic yard.

This Sauerman Scraper moves 15 cu. yd. load of clay loam across wide borrow pit at high speed.

dig, haul & dump
. . . . for a few cents per yard!

SAUERMAN Cableway or Scraper saves you money on long range material handling work because:

- Spans large area; digs and delivers anywhere within that area.
- Get its load, hauls and dumps in one automatic movement.
- Entirely operated by one man.
- Power cost and upkeep expenses are exceedingly low.

Our engineers are always at your service to give advice and suggest cost-reducing methods based on their 35 years' experience. Write for catalog showing hundreds of typical Sauerman jobs.

SAUERMAN BROS, INC.
574 S. CLINTON ST. CHICAGO 7, ILLINOIS

GATKE Moulded Brake Blocks and Frictions. Made to fit all makes and sizes of Shovels, Draglines, Hoists, Dredges, Etc.

GATKE Clutch Facings in Disc, Gear Toothed, and Cone types. Made for all applications.

GATKE Heavy Duty Woven Brake Lining

Dura-Blok Wire-Back Moulded Brake Lining (Types for internal and external brakes)

HERE are the brake materials that stand the gaff on tough jobs wherever you find them.

GATKE High-Heat-Resisting Asbestos Brake Materials are made and service-proved for all kinds of brakes and clutches on all kinds of excavating, road building and construction equipment—LARGE or small.

Experience and knowledge acquired in more than 28 years of specialized development to meet operators' service requirements on tough jobs of all kinds go into the making.

Whatever your service GATKE has what it takes to do the job as it should be done.

We understand service requirements. Just tell us what you need.

GATKE Heavy Duty BRAKE BLOCKS and LINERS

Full Coverage Bolt-on Blocks

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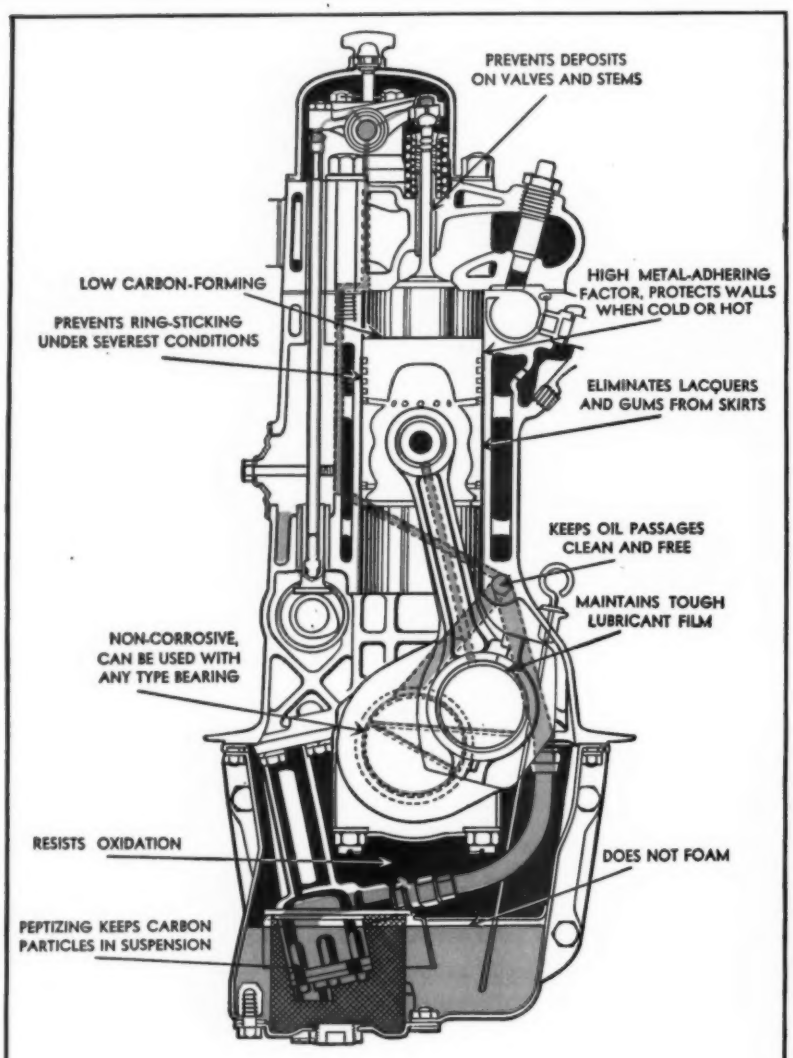
TYPICAL DIESEL LUBRICATION PROBLEMS:

4. Removal of Deposits from Engines

RPM DELO will clean your engine of sludge and other deposits, even in the ring-belt, unless accumulations of carbon, gum, varnish, etc., have cemented rings so tightly that oil cannot get behind them. The following procedure is recommended for purging conventional engine systems:

1. Drain present oil from crankcase while hot.
2. Renew filter element to trap abrasive particles that may be carried in circulation during purging.
3. Fill crankcase with RPM DELO.
4. Run engine at fast idle for two hours, maintaining water jacket temperature of approximately 200° F. minimum.
5. Drain again while hot and refill with RPM DELO.
6. Place engine in regular service and drain at one-half normal drain period or 750 miles, whichever comes first, for two or three drains. Check oil frequently as removal of deposits may temporarily increase oil consumption.
7. Drain while hot. Check oil filter and replace when necessary.
8. Refill with RPM DELO, returning to regular oil drain and filter change period, and continue to use RPM DELO.


PREVENTS DEPOSITS ON VALVES AND STEMS
LOW CARBON-FORMING
PREVENTS RING-STICKING UNDER SEVEREST CONDITIONS
HIGH METAL-ADHERING FACTOR, PROTECTS WALLS WHEN COLD OR HOT
ELIMINATES LACQUERS AND GUMS FROM SKIRTS
KEEPS OIL PASSAGES CLEAN AND FREE
MAINTAINS TOUGH LUBRICANT FILM
NON-CORROSIVE, CAN BE USED WITH ANY TYPE BEARING
RESISTS OXIDATION
DOES NOT FOAM
PEPTIZING KEEPS CARBON PARTICLES IN SUSPENSION

This diagram of a typical Diesel engine shows how RPM DELO keeps rings free and maintains clean operation.

RPM DELO is made from base oils especially selected for non-deposit-forming characteristics, and contains a detergent which keeps foreign particles in suspension. It also contains an anti-oxidant which prevents the formation of gums and lacquers. It is non-corrosive, may be used with any type of bearing.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (Concentrate). Ask your Diesel engine manufacturer or distributor for the name of the RPM DELO supplier in your vicinity.

The typical cleanliness of engine parts when RPM DELO is used is illustrated by this oil filter removed from an engine used in heavy duty Diesel bus service for 50,000 miles. Oil pump screen and valve chamber were comparabl clean.

RPM DELO

STANDARD OF CALIFORNIA

Their business is to help keep your business going

◀ *Big, well-equipped service shops enable "Caterpillar" dealers to offer their customers the last word in maintenance and repair service.*

In this dealer's repair shop, every kind of "Caterpillar" equipment receives the attention it needs in the ▼ *hands of skilled mechanics.*

➡ **DO YOU HAVE "IDLE" EQUIPMENT?** The War Production Board wants to locate usable track-type tractors, motor graders, cranes, shovels—vitally needed by mining, logging, oil-field, agriculture and other industries. What can *you* spare—to rent or sell? If you don't know where to contact your regional WPB officials, your "Caterpillar" dealer will gladly direct you and give you further details.

"CATERPILLAR" owners are fortunate in having a dependable service-dealer organization to which they can turn for expert inspection, adjustments and repair work at a time when obtaining new equipment is virtually out of the question—except for the most essential needs.

That your "Caterpillar" dealer is able to provide such services, despite the fact that his showrooms may be empty, is due to sensible long-range planning. His dealership has been established on the sound principle that doing business successfully is not alone a matter of making sales, but of *keeping sold equipment in good operating condition—come what may.*

During the long war years, your "Caterpillar" dealer has been steadily on the job—geared to come through for you. In fact, his shop is likely better equipped to serve you than ever before, with more factory-trained service men, finer equipment and the latest methods to save time, money and war-critical materials in keeping your machines at work. His desire now, as always, is to make your business more profitable and he is equipped to make that wish come true.

Have your "Caterpillar" service-dealer go over your equipment now—for inspection, adjustments, and replacement or repair of worn parts. In this way, not only can your operating costs be kept at a minimum, but the life of the equipment can, most likely, be prolonged by thousands of hours.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

THE "FIGHTING FOUR"

INSPECT Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. Read your Operator's Instruction Book.

LUBRICATE Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean—change before it becomes dirty and deteriorated. Follow the Operator's Instruction Book.

ADJUST Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work.

REPLACE Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

DEPENDABLE is the word for "Caterpillar" dealers

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TRACTORS • ENGINES AND ELECTRIC SETS • EARTHMOVING MACHINERY

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25 YEARS OF EXPERIENCE SPEAKS!

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MORRIS & YOUNG
CONTRACTORS
La. Nat'l. Bank Bldg.
BATON ROUGE, LA.

H. M. YOUNG, JR.

August 24, 1944

Dunham-Pugh Company
Baton Rouge, Louisiana

Gentlemen:

We are glad to answer your inquiry as to the performance of the four Mississippi Wagons we purchased from you. WE WOULD UNHESITATINGLY RECOMMEND THE MISSISSIPPI WAGON TO ANYONE INTERESTED IN HAULING EQUIPMENT OF THIS TYPE FOR THE FOLLOWING REASONS:

These four Mississippi Wagons are consistently hauling 2000 yards of dirt each 10 hour day, or 500 yards for each unit, with a fuel consumption of 1½, and never exceeding 2 gallons an hour for each unit. Our hauls range from 3500 to 5000 feet round trip, and we are crossing a concrete highway going to and returning from the dump. Since our job is in low swampy country this performance is very pleasing to us.

I have been in the contracting business since 1919, and until we purchased the Mississippi Wagons I had not seen a hauling unit of this type, that was suitable for short hauls such as we are on at present, and also most suitable for 15 to 20 mile topping and gravel hauls, which makes them an all round hauling unit.

This, together with their low first cost, cheap replacement of parts, ability to get over soft ground without cutting up the haul road, plus their fast snappy performance with very unskilled operators, has pleased us very much with our investment.

Yours truly,

E R Morris

MORRIS AND YOUNG

"...AN ALL 'ROUND HAULING UNIT"

Experience With Mississippi Wagons

FIRST HAULING UNIT SEEN SUITABLE FOR LONG AND SHORT HAULS . . . MAKING "AN ALL-ROUND HAULING UNIT" FOR CONSTRUCTION, OR HAULING TOPPING OR GRAVEL.

MISSISSIPPI WAGONS on a current Morris & Young job at Lottie, La.

A man with 25 years experience in the contracting business can speak with authority. That is why we take pride in reproducing the letter on the opposite page. It is but further evidence that the MISSISSIPPI WAGON is the "world's most modern hauling unit" and a natural money-maker on long or short hauls. We ask you to investigate the MISSISSIPPI WAGON and see how it will fit into your contracting program.

Postwar competition will be tough, but not for the owner of

MISSISSIPPI WAGONS,

the "world's most modern hauling unit."

Contact your nearest International Industrial Power dealer for complete information on MISSISSIPPI WAGONS.

Shots from the Firing Line

(Continued from page 534)

As soon as the tunnel has been lined with concrete, it will be ready to bring water from the western or Pacific slope of the Rockies to the eastern side, furnishing supplemental irrigation water for 615,000 acres of fertile farm land in northeastern Colorado.

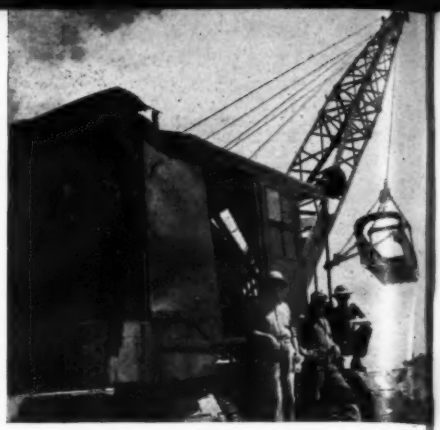
Several miles of wood-stave pipe will be laid on top of the ground as a temporary means of bringing water from the east end of the tunnel into the Big Thompson River, so that it will flow to storage reservoirs for the supply of various irrigation canal distribution systems now in service. This makeshift device will be used until after the war, when a permanent conduit and tunnel system will be constructed.

The Alva B. Adams Tunnel, a part of the Bureau of Reclamation's Colorado-Big Thompson project, is named for a former United States Senator from Colorado who aided in initiating the latter. Other features of this Reclamation project are:

Shadow Mountain Dam, which will impound the flow from the north fork of the Colorado River and enlarge the existing Grand Lake, is under construction as a part of the war program. When completed, it will make available about 90,000 acre-feet of water a year for diversion through the tunnel to increase war food production on the eastern slope of the Rocky Mountains.

The building of Granby Dam, which will be the main source of water supply, will be deferred until after the war. When it is finished, it is expected that approximately 310,000 acre-feet of water will be diverted through the tunnel annually. This will supplement the irrigation water supply for 615,000 acres in northeastern Colorado.

Power-development features of the Colorado-Big Thompson project will be constructed as needed. Green Mountain Dam has been completed on the western side of the tunnel. It will store 152,000 acre-feet of water and provide compensating storage of late season irrigation water for use on the western slope.



● This Bucyrus-Erie 1½-cu. yd. dragline can take it — in more ways than one. Damage to the cab roof is from a Jap shell. No, Warrant Officer S. P. Wilson (CEC) USNR, left, and the other two Seabees were not in this position when the shell struck. In fact, they seldom have an opportunity to relax for there is always work to be done in the Marshall Islands — cleaning up newly captured islands, burying dead Japs, tearing down enemy pillboxes (often mined), and building and maintaining air strips for the advance on Tokyo.

Warrant Officer Wilson, a construction equipment expert with a long background of licking tough digging jobs says he has a swell bunch of Seabees in his outfit and that although some had never handled a piece of machinery larger than a typewriter before entering the Service, they are willing workers who are on call 24 hours a day and pitch in and get their jobs done ahead of schedule.

Highway Research Board Meets November 22-25

The Twenty-fourth Annual Meeting of the Highway Research Board will be held this year, November 22-25, at the Netherland Plaza Hotel, Cincinnati, Ohio.

The first two days will be devoted to meetings of the various committees and departments. Several departments will have open sessions on the 23rd for the presentation of papers and reports.

Only PAINT Deep

But the Quality Goes Through and Through

The RED-STRAND in "HERCULES" Wire Rope is only paint deep. But what it stands for penetrates through and through, as it represents long experience, diligent research, and advanced manufacturing methods—all of which add up to top-flight service.

In the Preformed type, too, the Red-Strand is always a "red-letter" buying guide. It is easier, quicker and safer to handle. It reduces "breaking-in" time and it lasts longer.

Meet the unprecedented demands of today by specifying "HERCULES" on your purchase order.

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SEATTLE • • 3410 First Avenue South

Digging An Axis Grave

An American Bullgrader digging, literally, an Axis grave is symbolic of the jobs dirt-moving equipment has done to speed complete Victory. On every front, the work of bulldozers, Dozershovels, scrapers, etc., hastens the final funeral of the frenzied fanatics.

A Bullgrader digs a burial place for dead Japanese.

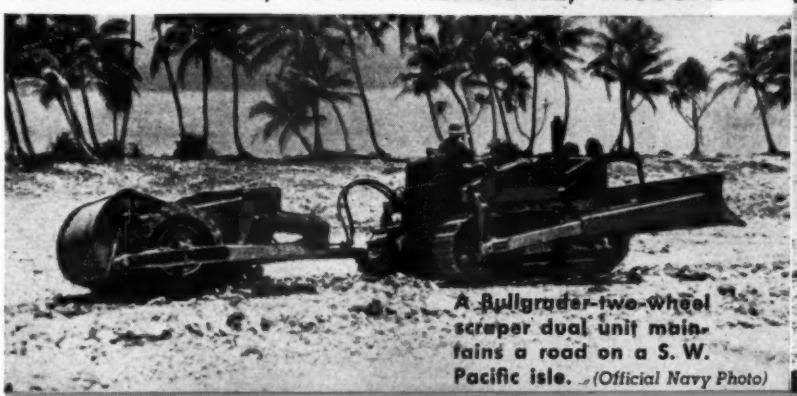
On every front, too, Bucyrus-Erie tractor equipment like the Bullgrader above is in the thick of it. Outstanding as always, now it is helping prepare the Axis burial.

N-71C

A Bullgrader begins preparing a road at Tarawa. *(Official U. S. Marine Corps Photo)*

Most of our production must still go to our armed forces; a limited number of machines is, however, now available for high priority civilian operations. Be sure to see your International TracTracTor Distributor for information on new machines, rentals, and service.

BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WISCONSIN



A Bullgrader-two-wheel scraper dual unit maintains a road on a S. W. Pacific isle. *(Official Navy Photo)*

A Dozershovel cleans off a beachhead at Guadalcanal. *(Official U. S. Marine Corps Photo)*

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR
INTERNATIONAL TRACTRACTOR
DISTRIBUTOR

• This section of the Burma road in China contains 24 switch-backs. The picture was taken by a U. S. Army Signal Corps photographer in the China-Burma-India theater last June.

OBITUARIES

WILLIAM M. BAGER

As we go to press the sad news of the death of William M. Bager, 65, Pass Christian, Mississippi, has been received. Mr. Bager has been associated with Bucyrus-Erie Company for a period of 41 years, serving as Vice-President from 1929 to 1943 when ill health made it advisable for him to give up many of his duties. Since April, 1943, Mr. Bager has been Technical Adviser, working on special assignments. His many friends in the excavating industry will mourn his loss.

COL. HENRY MATSON WAITE

Col. Henry Matson Waite, 75, construction engineer who supervised the spending of $3,300,000,000 within 14 months in 1933 and 1934 when he was deputy administrator of the Public Works Administration, died Sept. 1 at his home in Washington, D. C. At the time of his death he was a consultant on war projects in the U. S. Budget Bureau.

During the First World War he served as chief engineer and deputy director of transportation on the staff of the American Second Army and as deputy transportation director with the Third Army in Germany. He received the Distinguished Service Medal and was made an officer of the Legion of Honor by France. Following the war he was a consultant engineer, except for his period of service with PWA, with which he served as chairman of the Chicago Subway Commission.

Colonel Waite was a former vice president of the American Society of Civil Engineers and the Society of American Military Engineers, and a member of several other engineering societies. A native of Toledo, Ohio, he received his early education there and attended Massachusetts Institute of Technology from 1886 to 1890. Later he received the honorary degree of Doctor of Laws from the University of Miami in Ohio, and the degree of Doctor of Engineering from the University of Cincinnati.

His civil engineering career was started as a transit man on a Big Four railroad surveying crew. Two years later he was maintenance of way engineer, in another year division engineer of the Cincinnati, New Orleans and Texas Pacific Railway, then superintendent, and, by 1907, only 15 years after he began work, he was superintendent of the Seaboard Air Line.

Colonel Waite served from 1902 to 1912 as vice president and chief engineer of the Clinchfield Coal Corp. in Dante, Va., then city engineer of Cincinnati for two years, and city manager of Dayton, Ohio, for four. He was mustered back into railroading when the country entered the last war.

As a construction engineer after the war, Colonel Waite worked in drydocking and was a private consultant in New York. In 1927 he was called as chief engineer on construction of the $41,000,000 Cincinnati terminal, a job he finished in March, 1933. Designed to bring together every railroad serving the city and to eliminate a bottleneck that handicapped through freight movement, the Cincinnati project required the erection of 17 buildings, a huge two-deck viaduct, a great terminal building with a concourse 80 by 500 feet, the laying of miles of track over a 280-acre tract, and the lifting of that track above flood level by bringing in 5,500,000 cubic yards of fill.

After finishing the Cincinnati project a month ahead of schedule, Colonel Waite accepted Harold L. Ickes' invitation to head the PWA engineering

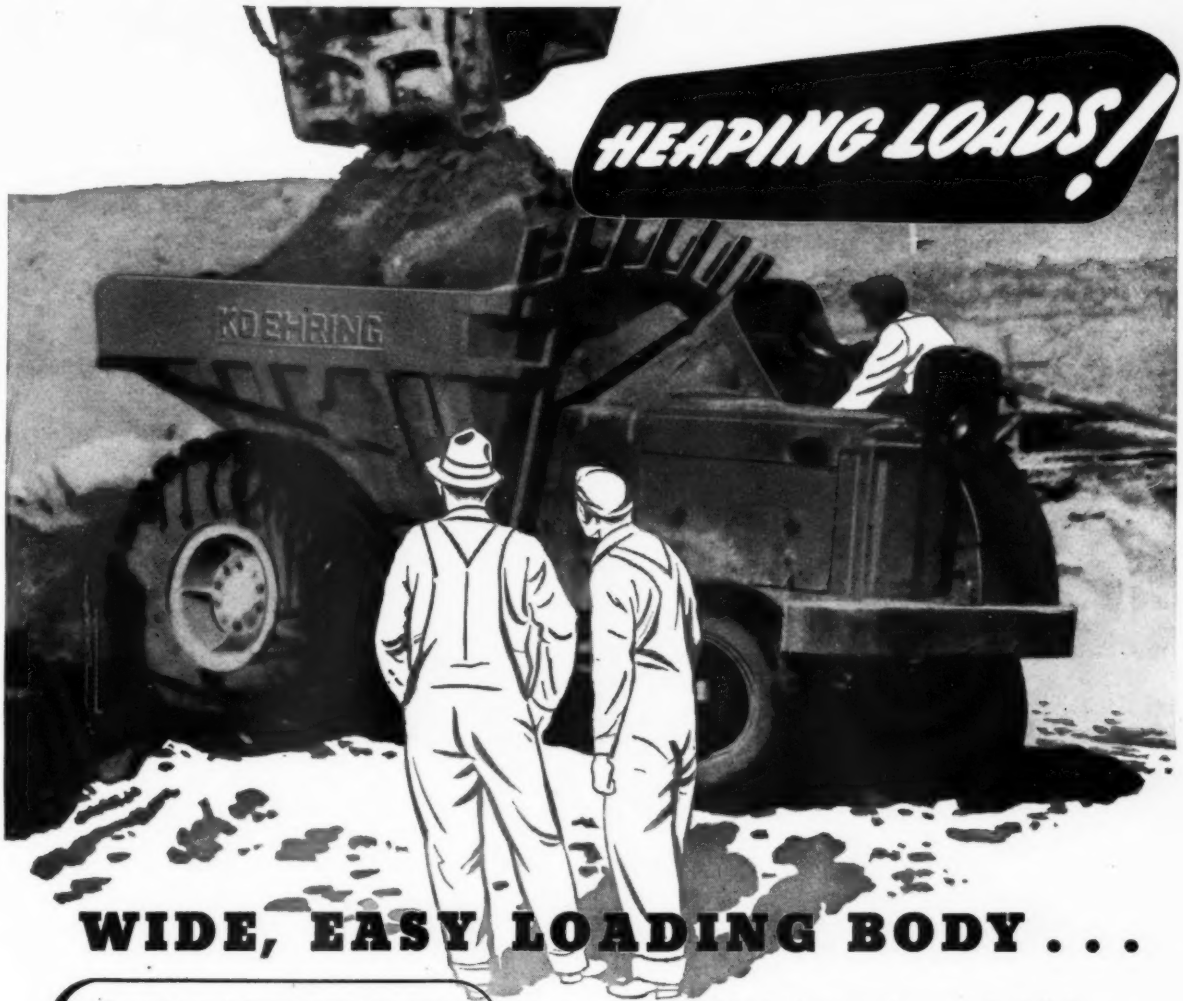
(Continued on page 545)

• Bulldozers and scrapers have for years been effectively used in coal mining and stripping operations, but it is relatively recently that dealers have used this equipment to good purpose at the docks. Above is a Heil hydraulic bulldozer mounted on a Cletrac tractor working at The Northern Coal & Dock Co., St. Paul, Minnesota.

Official U.S. Navy Photograph
La Crosse 50 Ton Semi

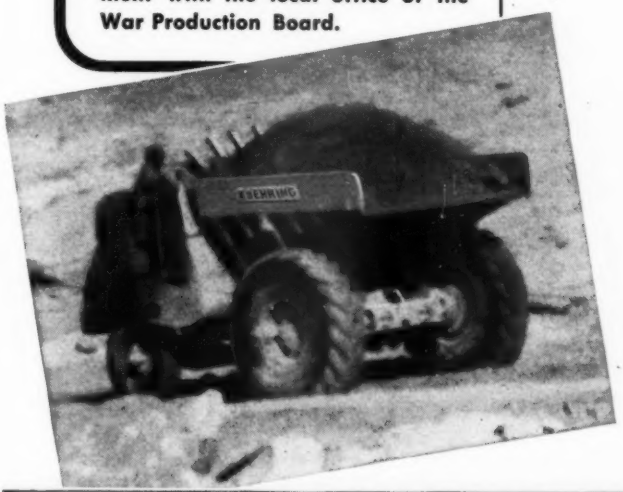
Buy Bonds Regularly

La Crosse Trailer & Equipment Company
LA CROSSE, WISCONSIN



WIDE, EASY LOADING BODY . . .

If you have idle construction equipment, make it available for home front use, where it is urgently needed. Register all your idle equipment with the local office of the War Production Board.



Wide body top opening permits full, heaping loads, assures easy and quick spotting of shovel dipper. Heaping loads every trip increase production. Short wheel base and three shuttle speeds make it easy to maneuver in tight spots, close to the loading unit. That, combined with the wide body top opening, cuts shovel swing time for more dipper passes per hour. Seconds are saved with every move . . . you get more loads per hour with Koehring Dumptors.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

ARMY E NAVY

KOEHRING K HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

Let's get

every machine into the fight!

THERE isn't a thing within your power you wouldn't do to help win the war. You want to hasten victory; and to help save as many of the lives of our brave fighting men as possible.

What, besides buying War Bonds, aiding Bond sales, and doing essential work, can you contribute to the war effort? Here is something:

Rent, sell or trade any of your equipment that happens to be idle or which you can otherwise spare for more urgent uses.

The rising tide of the war effort is creating extraordinary demands for heavy construction equipment — especially track-type tractors. The War Production Board is asking for every piece of used equipment that can be gathered to supplement what the factories are able to build.

Most any machine, regardless of make, age or condition, can probably be used somewhere. Your Government will help find a place for it. Write or telephone the nearest War Production Board office. If you don't know its location or any of its personnel, your "Caterpillar" dealer will gladly help you make the proper contacts.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TRACTORS • ENGINES AND ELECTRIC SETS • EARTHMOVING MACHINERY

OBITUARIES

(Continued from page 542)

department. Following his service with PWA he became director of the Regional Department of Economic Security in Cincinnati and at the same time returned to private consulting practice.

Surviving are his wife, who was Mary Mason Brown of Lexington, Ky., at their marriage in 1914; and a brother, Morrison R. Waite of Cincinnati.

GEORGE T. ATWELL

George T. Atwell, 68, whose contracting firms dug foundations for virtually all of Rockefeller Center and for many more of the major construction projects in New York City in the last 45 years, died August 28 in a New York hospital.

Born in New York City and educated in public schools there, Mr. Atwell started work as a bookbinder. Around the turn of the century he turned to the construction field. From then on his business, which included general contracting, foundation, shoring, underpinning, and subway construction work, prospered. His present firm, the George J. Atwell Foundation Corp., was founded in 1927. He also was president and director of Thompson-Starrett Co. from 1941 until his resignation in October last year.

Mr. Atwell referred to Manhattan as "the toughest place in the world to dig a hole" because of the varying nature of its subterranean recesses. He pointed out that at Rockefeller Center, for instance, the excavator could delve into solid rock, while the Federal Courthouse site on Foley Square rested on river silt, requiring 45 miles of cement-filled steel pipe for support. At 110 Wall St., his excavators found themselves probing what once had been a little island, surrounded by refuse from a bygone saloon.

His workers built foundations for the New York Life Insurance Company Buildings, on the site of old Madison Square Garden; the Hotel New Yorker, much of the West Side Highway, sections of the Independent Subway in Washington Heights and Long Island City, and the Manhattan approaches to the Queens-Midtown Tunnel and the north tube of the Lincoln Tunnel.

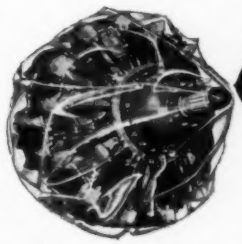
Mr. Atwell recently had been actively engaged in plans for postwar construction work. For several years prior to the outbreak of war he had recognized the problems of national defense and repeatedly had urged the construction of underground storage and emergency shelter facilities.

Mr. Atwell, together with George S. Kelley, one of his mechanical engineers, was co-inventor of a dust trap for pneumatic rock drills to ward off silicosis dangers, demonstrated in May, 1932. He also was honorary president of the first Sidewalk Superintendents' Club, begun for the Holland House excavation at Rockefeller Center in 1938, with the Dutch motto, "The Best Pilots Stand on the Shore."

Besides his engineering interests, Mr. Atwell had long been active in Democratic politics and served as president of the National Democratic Club from 1926 to 1929.

Mr. Atwell, who resided in New York at the Hotel Pierre, was president, director and a trustee of the Prudence Securities Corp.; president and director of the Nelson Towers Realty Corp. and the 1961 Corp., and a director of Mason, Walsh, Atkinson, Kier & Co., the New York City Omnibus Corp. and the National Safety Bank and Trust Co. He was a member of the advisory board of the American Mutual Liability Insurance Co., and a director of the National Horse Show Association.

Surviving are his wife, Mrs. Mary Atwell; a son, Lieut. George J. Atwell, Jr., USNR, and three daughters, Mrs. William Duryea, Mrs. John Krinsky and Mrs. Edmond Bradley Martin.

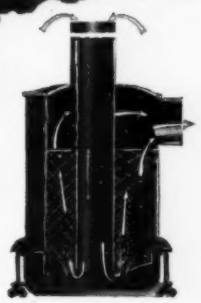


THIS is ONE WAY to PROTECT YOUR ENGINES Against Dust & Grit . . .

Airplane engines are now being shipped to fighting fronts well protected by a sealed transparent wrapping.

But

ENGINES IN *ACTION* Need DONALDSON— *Oil-Washed-Air* PROTECTION



Engines in operation cannot be sealed air-tight against the ravages of dust and grit . . . because engines must breathe. But they receive the same absolute protection when they are equipped with Donaldson Oil-Washed Air Cleaners and Donaldson Positive Crank Case Ventilation.

Donaldson installations are standard equipment on gas and diesel operated excavating and construction equipment as well as stationary power units, farm implements, tractors, trucks and busses, made by the world's foremost manufacturers of these lines.

Donaldson protection for your engines will go a long way in keeping customers satisfied by maintaining operating efficiency and lengthening engine life.

The Donaldson Air-Cleaner engineering staff, with the longest record of experience in the industry, is available to you for consultation on your dust problems. Write us.

Double Scrubbing Action

The Donaldson Oil-Washed Air Cleaner scrubs its own element as it scrubs the air. Completely self-washing.

DONALDSON COMPANY, INC.
566 PELHAM BOULEVARD SAINT PAUL 4, MINN.

DONALDSON *Oil-Washed* AIR CLEANERS

WORLD'S FIRST MANUFACTURER OF AIR CLEANERS

Field NOTES

All-purpose Grease Fitting

The Ordnance Department, Army Service Forces, has developed a new lubricating fitting that speeds up lubrication of all types of fighting equipment.

General MacMorland, Deputy Chief of Ordnance Field Service for Planning, states that the lubrication of all Ordnance materiel, including tanks, motor transport vehicles, field artillery, anti-aircraft weapons, etc., has been greatly facilitated by the use of one standard lubricating fitting which eliminates 15 to 20 different types of fittings and five different types of couplers formerly used.

This improved Ordnance development has facilitated a standardization program on lubricating equipment by which grease guns have been reduced to less than half the number formerly used, reducing spare parts requirements and at the same time, effecting maximum interchangeability.

Procurement of special types of lubricating guns has been eliminated by effecting minor modifications on approximately 200,000 lubricating guns in storage and utilizing them in the new program.

Arc-welded Tractor-trailer

For several years, Reynolds Brothers of Sturgeon Bay, Wisconsin, hauled a tractor with dozer attachment on a semi-trailer flat rack whenever their work was to be carried on at a distance from their shop. While the tractor was not so heavy (7½ tons) it was mean and dangerous to load with planks and blocking. Last winter one of the drivers dumped the tractor off the trailer and it took a wrecking crew half a day to untangle the wreckage and two men one week to repair the damage to the tractor and truck.

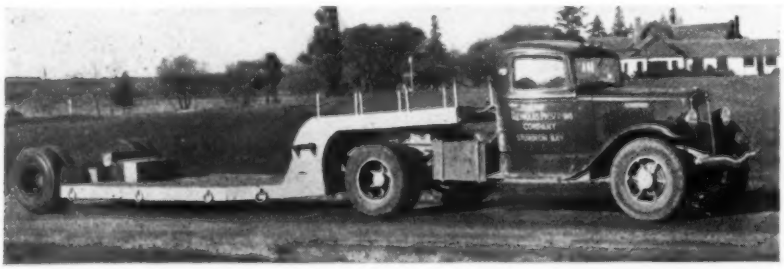
The Reynolds Brothers decided to build in their own shop by arc welding a trailer suitable for their needs. They located an old dump truck with good heavy frame which they bought for $30.00, and together with two heavy rear ends, two old motors and various thicknesses of plate, they started to build this 8′ x 25′ overall trailer in their own shop that measured only 20′ x 30′. The underslung bed was to be 8′ x 14′ with a ground clearance of 10″.

All welding was positioned on a frame by revolving work similar to fish net reel. The frames were made tubular instead of just channel, and the four main beams 3″ x 7″ tube. Cross frames were 2½″ x 6″ tubes alternating with 2½″ x 6″ tee's made from plate.

The goose neck to get the rise to the fifth wheel was made of two arched tubes 8″ x 4″ x 8′ and was gusseted throughout to keep from buckling. Whenever strength was doubted, 7/16″ fish plates were added and concealed in tubes and arches. The various plates used were 1/4″, 3/16″, 5/16″ and in a few places 7/16″. Deck plates were made by spotting floor plate design on common smooth plates with 3/16″ rod.

Air booster brakes were built in complete. The fifth wheel pin is made standard size to fit any tractor wheel lock and was made on their lathe out of a 4″ drill jaw and welded into frame of tractor with gussets.

The trailer weighs 5,945 lbs. and was completed in three weeks with one welder and a helper. The approximate cost was $600.00. Built to haul eight tons, it has since hauled 15 tons (two tractors loaded crosswise). Barred deck for fuel oil is old pipe with chain railing; steps to barrel deck are welded on each side and emergency jacking shelf all welded to the gooseneck. Necessary loading equipment are two blocks of wood to raise front of tracks so trailer can crawl onto bed of body.

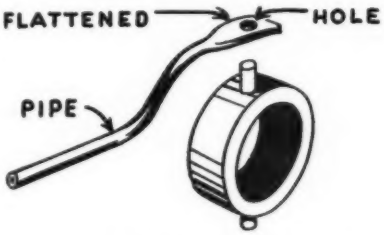


• Completed trailer weighs 5,945 lbs. Built to haul eight tons it has since hauled 15 tons. One welder and a helper built the trailer in three weeks.

It formerly required two men at least two hours to load, haul five miles, unload and return, but now with the new trailer the same can be accomplished in one hour with only one man and with much more safety than before. "We don't even travel the tractor as short a distance as one mile now," says Reynolds, "it's easier to load and haul, and saves tractor wear."

(Photograph and data Courtesy, The Hobart Brothers Co., Troy, Ohio)

—By Fred Reynolds



• Utility spanner wrench made out of ordinary iron pipe.

Utility Spanner Wrench

Should you lose your regular spanner wrench, as sometimes happens, and need one in a hurry, a good practical wrench can be made out of ordinary iron pipe.

Flatten one end of the pipe, drill a hole of correct bore through the flat, bend the "handle" to proper fitting shape, cut the pipe to the length you want, and you are "all set."

—By W. F. Schaphorst

Freezeproofed Fire-barrels

Providing fire-barrels with water and buckets for an emergency is a most practical safety measure that may mean saving vital structures and materials from fire loss. However, one can't fight fire with water that is frozen, so in cold weather calcium chloride is used in fire-barrels to keep the water from freezing. 100 lbs. of flake calcium chloride in a full 50-gallon barrel will keep the water from freezing down to 10° above zero; 150 lbs. protects to 10° below zero; and 200 lbs. will prevent freezing down to 60° below zero.

Water freeze-proofed with calcium chloride affords year-round fire protection. It will not evaporate nor become foul, and neither will mosquitoes or other water organisms breed in it.

To gauge the amount of calcium chloride to be used according to the capacity of the container and the freezing protection desired, use the following table, which also shows the specific gravities of the various concentrations so that the strength of

JACKBITS
Lower Drilling Costs

1. The wide range of Jackbit designs and sizes permits the use of small starters and minimum gauge changes. This greatly increases drilling speed. On one large tunnel job, when Jackbits were put to work, the drilling time dropped from 16.4 to 13.5 minutes per foot of heading advanced.

2. Jackbits result in the use of sharp bits a greater percentage of time. Rock drill upkeep costs are thereby reduced.

3. Air consumption per foot of hole drilled is less.

4. The cost of drill steel transportation is practically eliminated.

5. Jackbits reduce the amount of drill steel purchased annually.

6. Reconditioning is easy and costs are low.

The *Jackbit Line* is complete. You can resharpen your Jackbits on an I-R Grinder or Hotmill. You can heat-treat them in I-R Furnaces. You can forge Jackrod threads and shanks in I-R Sharpeners. You can easily and quickly convert your engine lathes for the complete Jackrod threading operation with the new Box Tool and adjustable Die Head.

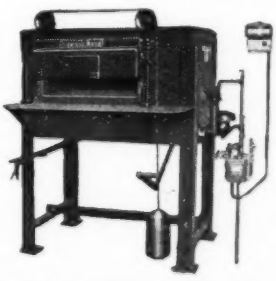
The experiences of contractors, mining men and quarry operators the world over show that the savings gained from the use of Jackbits range from 10 to 40%.

Ingersoll-Rand

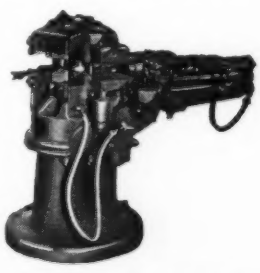
11 BROADWAY, NEW YORK 4, N. Y.

15-502

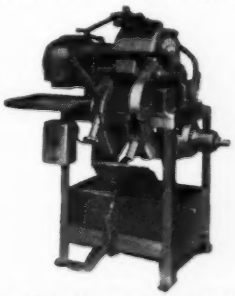
JACKBITS ARE BACKED BY A COMPLETE LINE OF RECONDITIONING EQUIPMENT



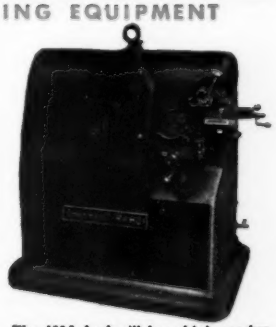
The JF Jack Furnace is a rapid-heating oil furnace designed for servicing Jackbits.



Four sizes of drill steel sharpeners permit the right selection for any job of shanking or threading, etc.



The J3 Jackbit grinder will regrind 35 hardened or 50 annealed bits per hour.



The JMA Jackmill is a high-production hotmill that handles 200 or more Jackbits per hour.

solution can be checked at any time with any hydrometer:

Lbs. of Flake $CaCl_2$ Per Gal. of Solution	Freezing Point	Specific Gravity
2.0 (2.20 lbs. per gal. water)	+10°F	1.147
2.5 (2.85 lbs. per gal. water)	0°F	1.185
3.0 (3.50 lbs. per gal. water)	—10°F	1.218
3.5 (4.20 lbs. per gal. water)	—26°F	1.250
4.0 (4.94 lbs. per gal. water)	—50°F	1.283

Calcium chloride solutions proportioned as shown in the table above can also be used in standard pump tank extinguishers and carbon-dioxide-internally-generated pressure tank extinguishers (but not in soda-acid or foam extinguishers), described in Regulations of the National Board of Fire Underwriters on the use of First Aid Fire Appliances. Any pump tank or carbon-dioxide pressure extinguisher containing water which may be exposed to freezing temperatures should be re-charged with a non-freeze solution of calcium chloride. Sprinkler systems that may be subjected to freezing temperatures can also be freeze-proofed with calcium chloride solution.

Highway Surface Repairs

The use of a jet of air is enabling Ohio's Cuyahoga County to do a much better job of repairing cracks in its highways, 500 miles of which are not subject to state maintenance.

Cracks occurring in cement and asphalt highway surfaces are blown out prior to applying new material in order that the added strip will have a substantial anchor below the surface.

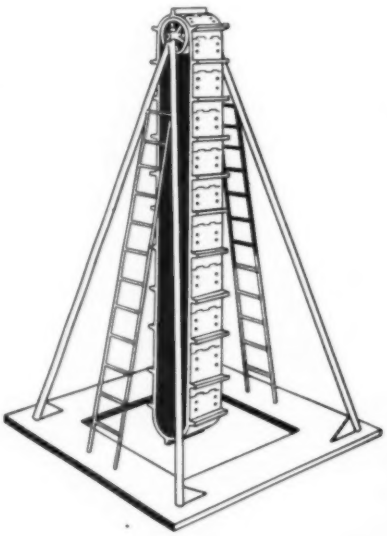
A. V. Dollard, maintenance engineer for the county, explained that

• **Repair strip gets good anchorage after compressed air stream blows out pavement crack.**
Courtesy Compressed Air Institute

repairing a wide crack without first cleaning out the loose and disintegrated material does not permit adequate penetration of the filling compound, and frequently results in just a mat over the crack rather than a completely filled and sealed joint.

"We use 90 pounds pressure of air from a portable compressor, directing the air stream through a nozzle into the crack, thus bringing out all dirt, broken cement and foreign particles. This provides good anchorage for the repair strip and insures a longer lasting and smoother surface," Dollard said.

"It may take a few minutes longer and a little more material," said Dollard, "but it's cheaper in the long run —and a much better repair job. Compressed air has always been a dependable source of power for us, and this blowing application is a new answer to an old and irritating repair problem."



• **Stand for welding tractor grousers is a time-saver for rebuilding with applicator bars.**
Courtesy Hobart Bros. Co.

Stand Saves Welding Time

The Oliver Iron Mining Company of Virginia, Minnesota, has 15 tractors to keep in operation and a stand used for welding applicator bars on the worn grousers has paid for itself many times in the handling of the tracks during welding.

It only takes a few minutes to put up the track and take it down with the aid of a crane, there being only four bolts to take off. With this all-welded stand, it is very easy to turn the sprocket and get the grousers in the most convenient position to weld.

This stand was constructed from all scrap material picked up around the shop and its total cost including electrodes and power was only $22.25 and was completed in two and one-half days time.

The applicator bars that the Oliver Company use are manganese, averaging 12 feet in length. It requires three bars to completely repair a worn track. First, cutting the bars to length, they are tack-welded into position and then the first bead is welded with 5/32" stainless steel rod. On the second bead, 3/16" or ¼" stainless is used.

—By Conrad D. Krantz

Straight Edge Piling Cuts

Marine and building contractors are eliminating the need for tedious and costly manual cutting with a special adaptation of the Davey Pneumatic Saw to the capping of piling in construction work on ferry docks, wharves, bulkheads, dry docks, etc.

Consisting of two lengths of pipe or bar stock secured forward and rearward beneath the unit, this device acts as a guide runner on the battens and insures a uniform, level cut within the tolerances of the battens. The appliance may easily be made by the contractor to suit his own specific need.

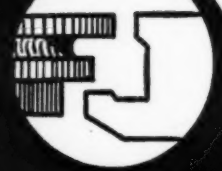
Because it eliminates the practice of shimming, and thus promotes sturdier construction, this method is especially applicable to any construction problem where piling must be cut very accurately to take the beams.

• **The above photos illustrate the Davey Saw cutting a section of piling to be capped, with the result, true-up to within 1/16 of an inch.**

For Air Economy USE Thor ROCK DRILLS

AIR INPUT Measured to .00025 of an inch for Balanced Power and Smooth Performance.

Spaces between the flanges and chest shoulders of this patented Thor Valve are controlled to a tolerance of .00025 of an inch to turn into power ALL air that enters the tool.



• Thor Rock Drills develop rock-smashing power and speed from every ounce of air that enters the machine through the patented Thor Positive Short-Travel Tubular Valve which controls air power by tolerances of .00025 of an inch!

Balanced power is one feature of such fine control—because only a precisely governed quantity of air is allowed behind the piston.

Smooth performance is another feature—because every stroke is powered by the same measured quantity of air.

And *air economy* is assured throughout the life of the Thor Rock Drill—because there are no separate parts of this patented Thor valve to lose or wear.

Thor Rock Drills offer many more features of design and construction—features providing complete control of drilling speeds, assuring dependable rotation, preventing clogging, and absorbing shock. For complete details about Thor Rock Drills and a wide range of associated air tools write today for Thor Catalog 42-A.

OTHER THOR AIR TOOLS

PAVING BREAKERS • CLAY DIGGERS • TAMPERS • SUMP PUMPS • GRINDERS • SAWS

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

Equipment

you ought to KNOW ABOUT

Temperature Calculator

Manufacturer: Lincoln Electric Company, Cleveland, Ohio.

Claims: Readily determines the welding preheating and interpass temperatures of steels where experience indicates the need for preheating to obtain best welding results. Serves as a convenient guide where steels have a higher content of carbon and other alloys and require preheating to minimize the tendency toward excessive hardening and possible cracking of the base metal adjacent to the weld. Consists of four movable sections of heavy cardboard stock 6¼ inches in diameter.

Snap-on Insulator Cap

Manufacturer: Martin Wells, 5886 Compton Ave., Los Angeles 1, California.

Claims: The reinforced snap-on insulator cap is one of the many features combined in the new Rod Saver, latest addition to the line of "sure-grip" electrode holders.

The insulator cap is made of heavy plastic with reinforced jacket. It is notched on the inside so that it slips over the vise body and is held securely in place by a steel spring. Since no screws are required to hold it the danger or arcing due to contact with exposed screws is eliminated. Insulators can be easily and quickly replaced right on the job by breaking the damaged insulator with the chipping hammer and snapping a new one into place.

The vise body provides a positive grip—up to 1,000 lbs. pressure per square inch that prevents dropping rods.

The new Rod Saver rod hole is set at a 60 degree angle, giving the welder greater flexibility and ease in reaching inaccessible and tight corners. The hold accommodates through 5/16" rods.

For further details about the equipment on these pages please write to the manufacturer, mentioning Excavating Engineer.

Asphalt Mixing Plant

Manufacturer: Iowa Manufacturing Company, Cedar Rapids, Iowa.

Claims: This unique plant which features easy portability by truck and swift erection and knockdown has a capacity of 3,000 or 4,000 pounds of hot or cold bituminous mix per batch. Electric, gasoline, or diesel power can be used. On electric drive plants, each controller unit is powered by an individual electric motor. Knocked down into three units, each mounted on pneumatic tires, this plant can be transported by trucks at 30 to 40 miles an hour.

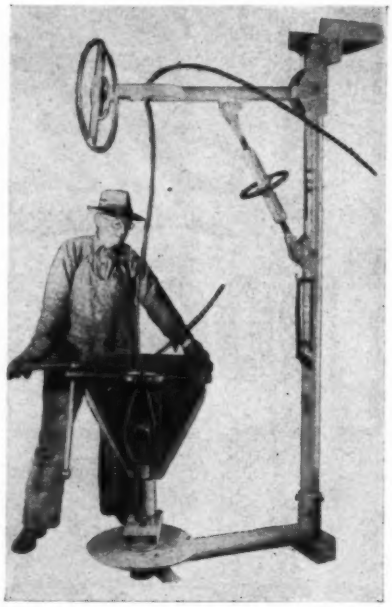
The plant can be erected by a small crew without the aid of a crane in 12 to 18 hours.

"Gar-Bro" Cable Splicing Rig

Manufacturer: Garlinghouse Brothers, 2416 East 16th St., Los Angeles 21, California.

Claims: Designed to greatly increase the speed and efficiency of splicing cable with a great reduction in the physical effort involved. Any standard splicing vise may be attached to the revolving stand. A vise over the splicing vise firmly grips the cable in its jaws and tension is placed on the cable between the two vises by means of a vertical screw adjustment of the tension member. The cable is untwisted for splicing by revolving the splicing vise stand.

The unit may be set up, bolted to a column or post, or lashed to a tree



in ten minutes. A perforated shelf on the back of the splicing vise holds Marlin spikes and other tools while hooks provided on the vertical member also may be used for tools. The overall size is 96" x 45", weighs 250 lbs., and may be dismantled in sections weighing no more than 100 lbs. each.

Electric Drill

Manufacturer: Independent Pneumatic Tool Company, Chicago, Illinois.

Claims: Fourteen per cent lighter in weight but packing more power per pound under its plastic armor this new drill has ¼" capacity. Construction of the drill, featuring double pro-

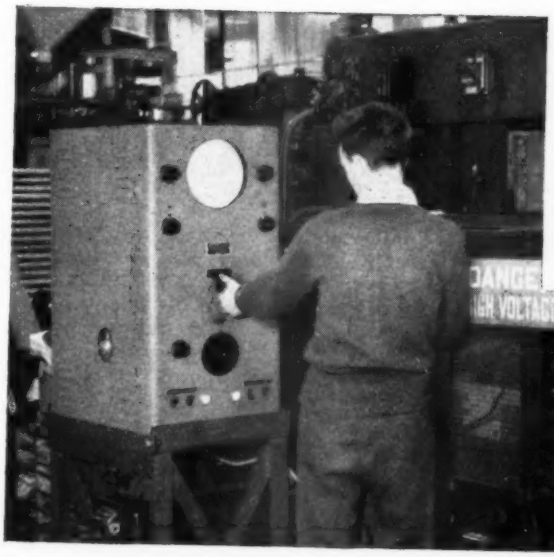
SHORTS STYMIED

Voltage surges which accompany switching and frequent starting and stopping of motors impose high dielectric stresses on the coil insulation, and can cause harmful short circuits. Yet this is an unavoidable condition of service for many motors.

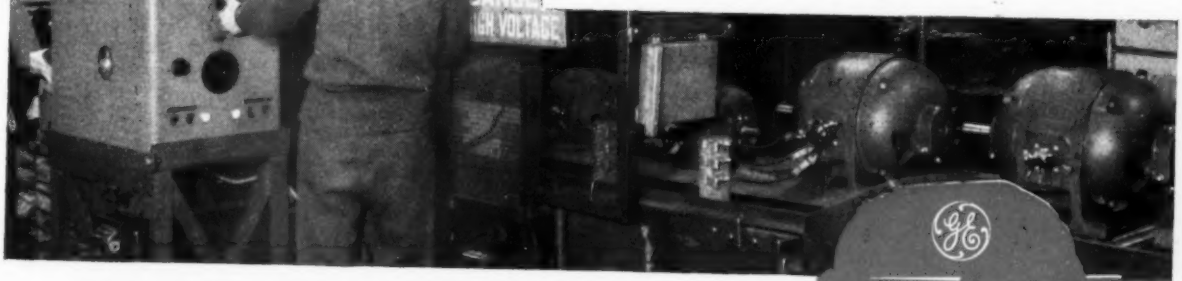
The grinder shown here, for example, starts and stops every time a finished part is removed and a new part inserted. But the two Tri-Clad motors that drive it have been built to withstand safely the voltage surges ordinarily encountered in this type of service. Their ability to "stymie" shorts was proved by *the new General Electric test* described below.

External grinder, equipped with two Tri-Clad motors, installed in the milk-machinery manufacturing plant of the Rite-Way Products Company, Chicago, Ill.

New high-potential, electronic surge-tester verifies strength of TRI CLAD motor windings



This electronic test of insulation makes a "cardiogram" of every Tri-Clad motor winding, ferreting out weaknesses that might lead to shorts caused by voltage surges in service. It tests each turn, coil, and phase group of the windings for adequate insulation strength to withstand the "steep front" high-voltage surges of actual service. First developed and applied by G.E., it's one of the production tests which all Tri-Clad motors must pass as they come off our production lines. – *General Electric Company, Schenectady, N. Y.*



GENERAL ELECTRIC

Each week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

TRI CLAD MOTORS

tection of the operating parts within an inner metal skeleton frame, that is covered by separate plastic housings, provides fast drilling because it is lighter and easier to handle. The drill weighs 3¼ pounds, measures 8-3/16 inches in length and is available in three speeds, 2500 rpm; 3750 rpm; and 5000 rpm.

"Torkontrol" Clutch

Manufacturer: The Algamated Engineering and Research Corporation, Chicago, Ill.

Claims: This new type of automatically engaging and self-disengaging centrifugal clutch can serve either as a coupling between shafts or as a driving pulley or gear in a transmission, as well as a starting cushion between power units and driven mechanisms. The Torkontrol consists of a partially filled oil chamber fitted with a freely rotating hub which carries a series of movable wedgeshaped flyweights. As the hub revolves these weights fly outwardly and engage the internal rims of the outer case binding the hub and shell into a functionally solid pulley or coupling. This unit works equally well in either direction and is "set" to engage or release at a given speed, and to slip in case of overload. The manufacturer claims that this unit permits the use of smaller engines or motors which start without load, give smooth cushioned application of power, and straight line acceleration with resulting saving in operating cost. Is built in all sizes from ¼ H.P. to 500 H.P. for both built-in and general application.

Self-Propelled Loader

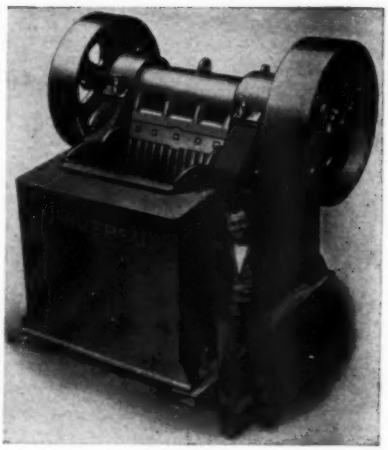
Manufacturer: Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Illinois.

Claims: For highway maintenance or construction jobs, loads surplus earth, sod, rock, sand, oil mix and hard-to-handle materials into trucks for removal and permits the salvaging of valuable road surfacing materials for use on other jobs. Also removes windrows of debris thrown out from ditch cleaning. The loader is one-man operated and travels under its own power at highway speed.

Jaw Crusher

Manufacturer: Universal Engineering Corp., Cedar Rapids, Iowa.

Claims: Composed of welded steel plate with lateral and transverse ribbing and heavy plate side walls, these roller bearing jaw crushers employ the same crushing action as the first overhead eccentric crushers built by Universal Engineering in 1906. There



is high structural strength to prevent distortion of frame or misalignment of bearings, with no excess weight. Four SKF bearings, labyrinth sealed against grit and grease, are used; two on the pitman and two on the frame. The two distinct crushing blows with each revolution of the eccentric shaft are produced by the high eccentric and radial toggle action; a primary blow at the top of the jaws and a secondary stroke at the bottom. Two sizes are in production, one with a 30" x 42" feed opening and the other a 20" x 36" opening.

Here's News! **Hydraulic Brakes . . .**

on Heavy Duty Trailers

another **new development by JAHN**

Now you can get heavy duty trailers with the same kind of hydraulic brake action that has been proved so efficient and safe by truck and pleasure car manufacturers. Jahn engineers have developed and thoroughly tested hydraulic brake application on trailers with capacities of 10 to 60 tons.

This new development means smoother, faster braking action with positive, equal brake pressure on all wheels and permits unlimited axle oscillation without affecting braking action. There's no possibility of partial application or dragging of brakes when operating over rough terrain. Full motive power of the prime mover is utilized in pulling the load. There are no brake rods to require constant adjustment. Safety is increased and maintenance simplified.

When you get a heavy duty trailer, insist on a Jahn trailer with hydraulic brakes.

C. R. Jahn Company, 1341 W. 37th Place, Chicago

Any Axle or Wheel Combination

JAHN *Heavy Duty* TRAILERS
In Capacities from 5 to 100 TONS

"COME TO TRAILER HEADQUARTERS"

Backward Stability . . .

(Continued from page 521)

one caterpillar track on a platform scale and weighing it twice, once with the boom and again with the rear end over that track. But in practice it is **difficult to do this.** The American Standards Association code is written to cover cranes up to 60 tons rated crane capacity, which may weigh as much as 80 tons. Under the code, 68 tons may be concentrated on one track. There are few platform scales of such capacity outside the plants of heavy industries. Railroad car scales are large enough and much more common but because of the scale house, rarely will they have the clearance room, shown in Figure 2, required to swing the machine. If this standard should be written into law as a safety code, it could mean taking a heavy machine off the job for several days and shipping it several hundred miles to find a satisfactory scale to check compliance—a safety requirement which cannot be checked invites avoidance.

A limitation which could be checked in the field without much difficulty is suggested in Figure 3. With the boom removed and a few simple precautions in blocking there need be no danger in performing such a test. Two 15 or 20-ton jacks would handle an 80-ton machine, which with a piece of rail, blocking, and a level protractor are all that is needed for a field check. Such equipment probably is obtainable on every job, or can be found nearby.

To permit this method of checking, paragraph 31 of Commercial Standard CS90E-41 could be rewritten to read—

"Backward Stability—To avoid excessive or sunsafe counterweighting of machines and to insure proper backward stability when used as a lifting crane, dragline, or clamshell excavator, a crawler-mounted type machine in working order (cooling system full, fuel tank half full) but without boom, shall be stable in all positions of the crawlers on a (X) backward slope."

Paragraph 1312b of the American Standard Association code B-30 could be rewritten to read:

"Tractor or crawler cranes without load and with boom removed, shall be stable in all positions with reference to the crawler, when on a (X) backward slope."

The relative safeties of the present rule and the proposed revision are not directly comparable; results under the present rule are influenced by the relation of boom weight to base machine weight and by the minimum operating radius chosen; results under the proposed rule are influenced by the height of the center of gravity above the ground.

The 70% limitation now included in the codes is based on the factor established for locomotive cranes and appears to be unnecessarily conservative for crawler-mounted machinery as large numbers of more heavily ballasted units are in successful use; and because the energy stored in the truck springs of a locomotive crane during a heavy lift constitutes a hazard not present with rigidly mounted crawlers.

A limit of 6° (10½%) backward slope is suggested in Figure 3, which is a fair average of stabilities based on the present rule; if a machine has

(Continued on page 554)

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Simplex
LEVER · SCREW · HYDRAULIC
Jacks

for every construction purpose
Awarded the Gold Medal for Safety
Ask for Catalog 44
Templeton, Kenly & Co., Chicago 44, Ill.

ERIE THE COMPLETE LINE **BUCKETS**

Erie builds *all* types of buckets in various weights and capacities to meet the job and operating conditions. Choose the correct bucket for the job and you get the maximum speed and output. Write for broadside on the complete Erie line of buckets

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Rapid destruction of enemy fortifications has greatly reduced allied casualties and accounted for the quick liberation of considerable enemy territory.

In digging and material handling too, rapid discharge of the load is an essential feature. Every Owen Bucket is engineered to provide capacity grabs and rapid discharge operation—factors responsible for their outstanding performance.

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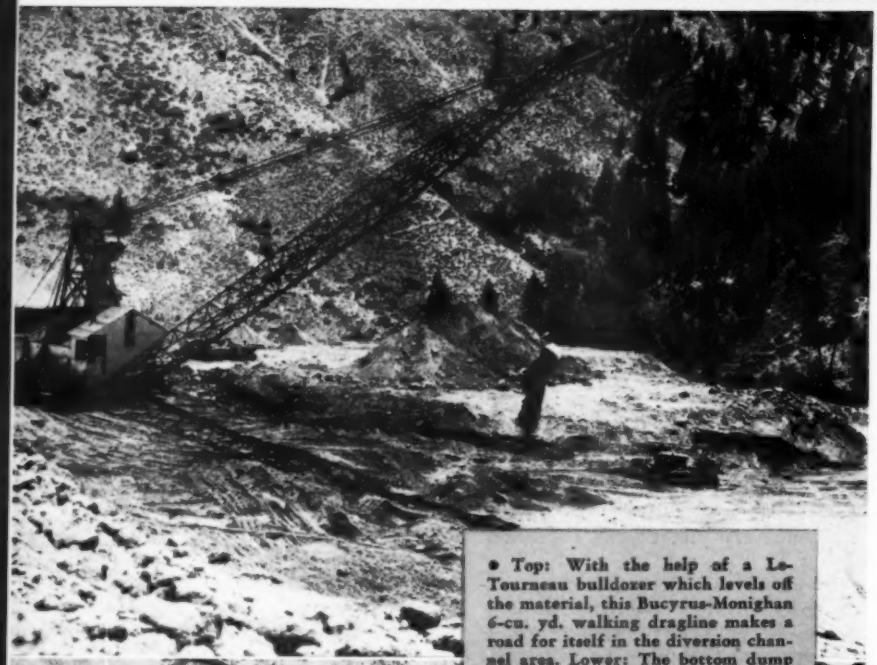
OWEN BUCKETS A MOUTHFUL AT EVERY BITE



• Top: With the help of a LeTourneau bulldozer which levels off the material, this Bucyrus-Monighan 6-cu. yd. walking dragline makes a road for itself in the diversion channel area. Lower: The bottom dump trailers make an interesting pattern as they load, haul, dump and return to the shovel for another load in the fill area. The two-drum, 20-ton sheepsfoot rollers to the right, center and left were specially designed by the Bureau of Reclamation for compacting the fill, levelled by bulldozers, in 8-inch layers.

• Arrowrock Dam, a 354' high, 1,100' long rubble concrete, arch-gravity dam completed by the Bureau of Reclamation in 1915 and raised five feet in 1936-37, is 42 miles downstream from Anderson Dam. Arrowrock Dam was built for irrigation purposes.

Anderson Ranch Dam

(Continued from page 519)

was delivered by conveyor belt directly to the base of the dam between cut-off walls. At first it was spread by three 12-cu. yd. scrapers, a dozer and a truck which hauled to tight areas inaccessible to scrapers. When the fill level came above the cut-off walls, small space operational restrictions were eliminated and additional equipment was put to work.

A new road, about 24 miles long, starting at the river level below the dam and ascending the hill on the northerly side of the right abutment, and from there blasted out of the steep slope of the mountain to a width of 16 feet was a rugged job. A Bucyrus-Erie 5-cu. yd. shovel followed the powder crew and dumped the earth into the reservoir. Bulldozers and motor patrols followed the shovel and levelled up. The road surfaced with gravel provides a new route to ranchers above the lake, as well as to give land access to the lakeshore.

V. A. Roberts is project manager for Morrison-Shea-Twaits-Winston, William N. Woodall is general superintendent and F. B. Morrison is office manager. Gilbert Waddell, present project engineer took over in May, 1943. Frank Peavey was project engineer prior to September, 1942. Robert Glen is master mechanic.

John A. Beemer was construction engineer in charge of the project for the Bureau of Reclamation until his retirement in January, 1944. He was succeeded by H. D. Bahmeir.

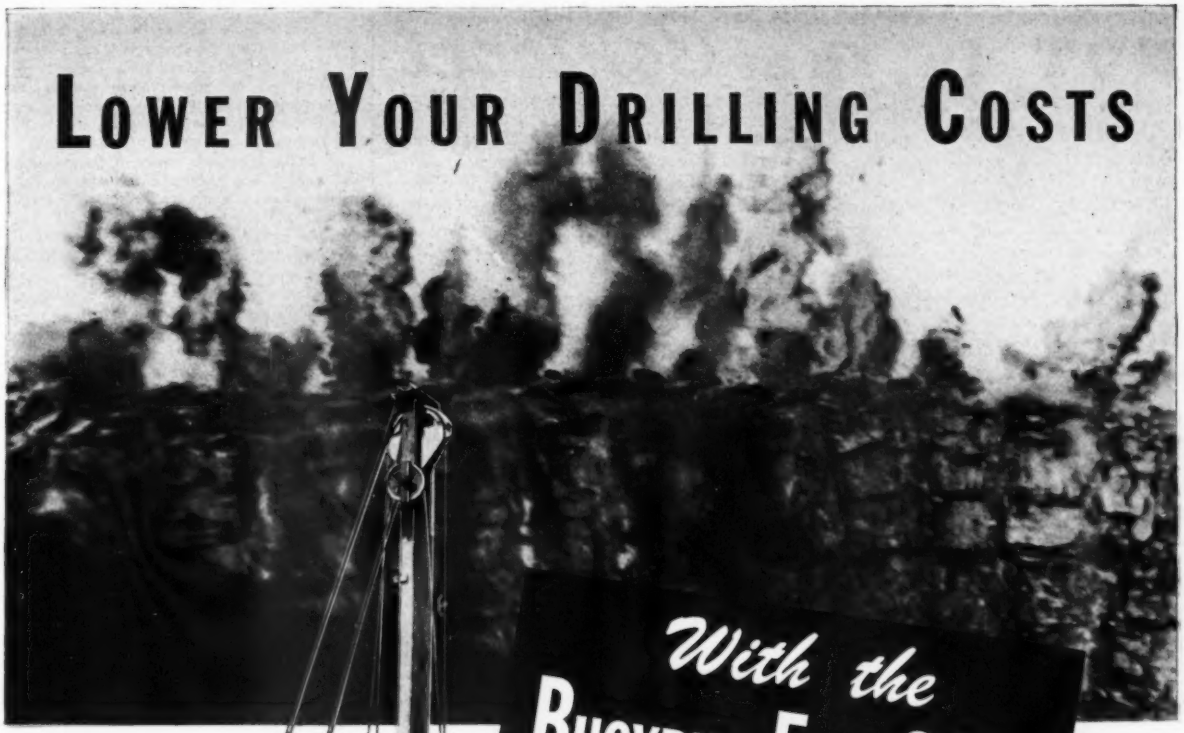
Backward Stability . . .

(Continued from page 553)

a heavy boom the 6° proposed limitation will give better backward stability for a bare machine than the 70% rule; if a machine has a light boom, backward stability will be less than with the present rule.

It is the writer's opinion that less slope than this 6° could be considered safe. The figure was chosen as being generally in line with the present **rule,** but reference to Figure 3 shows this to be quite a severe limitation, and a reduction to 4° (7%) might be justified. It seems obvious that if a rule of this sort is made unnecessarily conservative, users will avoid it by adding ballast in the field; on subsequent orders manufacturers would be forced to resort to some sort of subterfuge, such as shipping ballast after shipment of the machine, to equal fluid usage and so nullify the value of the code.

LOWER YOUR DRILLING COSTS



With the BUCYRUS-ERIE 22-T

Here's a blast hole drill that combines the advantages of larger machines with such rock-bottom economy that it's the machine you need for low cost drilling in small and medium-sized quarries, cement plants, construction projects.

The same shattering blows, speedy drilling, easy operation, mobility, and rope economy that have long characterized larger Bucyrus-Erie drills are yours with the 22-T. Self-propelling, it's thoroughly modern in design, all-steel in construction. With ample capacity to put down 6-inch or 6⅝-inch holes 100 feet or over, it gives you the profits that result from having a unit that's **right** for the job.

Try the 22-T on your work. The same features which have made Bucyrus-Erie first choice in large quarry and mining operations all over the world, will demonstrate the 22-T's ability to cut your drilling costs and increase your profits.

H-50C

BUCYRUS ERIE

SOUTH MILWAUKEE WISCONSIN

NOT in the *Contract*

Drunk (to splendidly uniformed bystander): "Shay, call me a cab, will youh?"

Splendidly uniformed bystander: "My good man, I'm not a doorman, I'm a Naval officer."

Drunk: "All right, then, call me a boat, I gotta get home tonight."

A drug house recently received the following letter from one of its customers:

"Gentlemen: Please send me six bottles of your wonderful nerve tonic. My wife was so nervous that nobody could sleep with her, but now, thank fortune, after taking one bottle of your wonderful remedy anyone can sleep with her. Please rush this order."

Introducing the new deacon to his father, who was deaf, a young man said, "Pop, this is the new deacon."

"New Dealer?" queried his father in surprise.

"No, no, not new dealer. New DEACON," repeated the lad. "He's the son of a bishop."

The father nodded wisely. "They all are," he sighed.

An O.D. was making the rounds and came upon a rookie on guard duty. The O.D. asked the rookie: "What is general order number six?"

"Don't know," replied the rookie.

The O.D. tried again. "What is general order number four?"

Came the answer, "Don't know."

"What did the corporal of the guard tell you?"

"Watch out for the O.D., he's a louse."

A corset is something that keeps the waves out of the WACS.

The five little pigs went into a beer parlor.

"One beer," said the first and second little pigs.

"One beer," said the third and fourth little pigs.

"Seven beers," said the fifth little pig.

"What's the idea?" asked the bartender of the fifth little pig.

"Don't you know?" rejoined the other. "Why I am the little pig who goes wee wee wee all the way home."

It was a busy day for mother, and to make it worse her small son came running into the house with his pants torn.

"You go to your room and mend those pants yourself," she ordered, "and don't let me see you out here until the job is done."

A little later she went in to see how the repair job was coming along. The pants lay on a chair and the door to the cellar, usually closed, was open. The mother called down sternly. "Are you running around down there without your pants?"

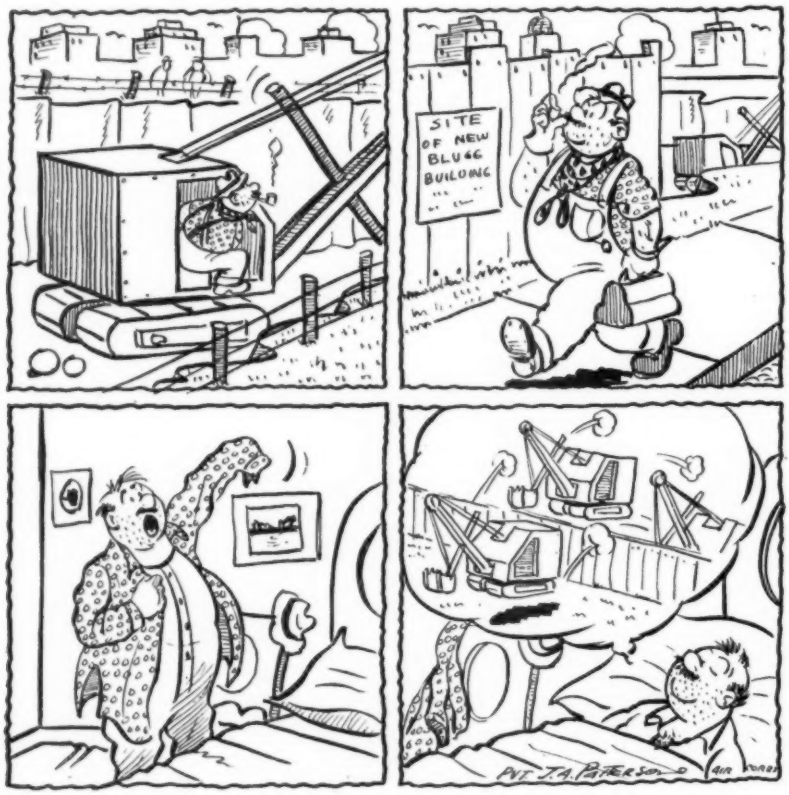
A deep voice answered, "No, ma'am, I'm reading the gas meter."

A motorcycle cop pulled up beside a car parked on a country road in the wee small hours of the morning. "Hey," he yelled, "what business have you got to be out here at this time of the night?"

"This isn't business," came a voice from within, "it's pleasure."

Telephone operator to new girl she is breaking in: "No, honey, you say 'Just a minute please,' not 'Hang on to your pants, mister'."

"If you want to go to heaven, stand up!" shouted the Evangelist. All stood expect one old man. "Don't you want to go to heaven?" asked the preacher. "Yes," said the old man, "but I don't want to go with no excursion."



There was a middle-aged negress employed as cook in a white family. At her earnest solicitation her daughter about seventeen years of age, had been engaged as a housemaid. One morning the lady of the house overheard the mother scolding her daughter for some neglect of her duties.

"Yo' sho is one no' count nigger," she said. "Shiffles' dat's what you is; shiffles' an' onery. You is jus' zackly like your pa. I suttingly is glad I didn't marry dat nigger; I never had no use for him nohow."

Old lady (to little boy smoking cigarettes): "You better stop doing that, otherwise you'll never become president of the United States."

Little Boy: "Oh, that's all right, lady, I'm a Republican anyhow."

A business man coming home from work was telling the family about the new stenographer he had hired that day. "She is the most beautiful girl I have ever seen, just like a baby doll."

His youngest daughter interrupted the conversation and asked: "Daddy, does she close her eyes when you lay her down?"

Notes from the manufacturers

Pioneer Engineering Works of Minneapolis, Minn., welcomes back Orval "Bud" Ohnstad after a two-year leave of absence during which time Ohnstad worked in Africa and Greenland.

Hazard Wire Rope Division of American Chain & Cable Company, Inc., Bridgeport 2, Conn., announces the appointment of Russell H. Foss as district sales manager for the New York District.

The Timken Roller Bearing Company of Canton 6, Ohio, announces the appointment of Howard C. Sauer as general manager of its newly-created Foreign Division, which will handle the sales and service of the Company's products, bearings, steel, and detachable rock bits, in the world market outside the U.S.A. The division's offices will be in Canton, Ohio.

John A. Johnson & Sons, Inc., Brooklyn, N. Y., had been awarded the general contract for the construction of a new subsidiary plant of The Goodyear Tire & Rubber Co. at Topeka, Kansas, which will build tires of a large dimension for military use.

The Euclid Road Machinery Co. of Cleveland 17, Ohio, has appointed M. H. (Hayes) Johnson, Northwestern district representative. He was formerly superintendent of construction for Morrison-Knudsen Company and for the past nine years specialized in the sale of heavy machinery for Intermountain Equipment Company of Boise, Idaho.

International Harvester Company of Chicago 1, Illinois, announced the formation of a new Foreign Operations organization which will be in charge of all the foreign activities of the company, except Canadian operations. The Harvester Foreign Operations organization will be headed by G. C. Hoyt as vice-president, who heretofore has been vice-president in charge of foreign sales.

C. N. King, formerly manager of foreign sales, becomes Director of Foreign Operations in the new set-up. A. M. Rode, formerly European comptroller and assistant treasurer of the company, has been appointed to the newly created position of Director-General of European Operations, and will have charge of all European activities. J. L. Camp, formerly an executive of the International Harvester Company, Argentina, has been appointed Director-General of Latin-American Operations.

Mr. King will be assisted by an executive staff of specialists, who will be designated as managers of foreign manufacturing, sales, engineering, accounting, supply and inventory, merchandising services, and treasury. These executives will be located at the general offices in Chicago.

There will be no change in the status of the company's various foreign subsidiaries, which will continue to operate as at present, carrying on the company's business in the respective countries in which they operate.

H. O. Penn Machinery Co., Inc., of New York City announces the appointment of Stanley Wardell as advertising manager of the company and sales representative for New Jersey. Mr. Wardell operated an advertising business for the past 19 years.

New trade literature

Title: **"Annual Report for 1943"**

Subject: The war role oil is playing is explained in this beautifully prepared booklet. Production, research, and marketing facts are included to emphasize the importance of oil today.

Where to Get: Standard Oil Company, 30 Rockefeller Plaza, New York, N. Y. (Free)

Title: **"Preformed Wire Rope"**

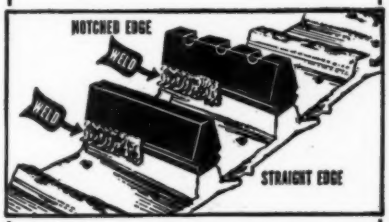
Subject: Two booklets, attractively laid out and illustrated, published by the Preformed Wire Rope Information Bureau, tell of the rise in popularity of the use of preformed wire rope since its introduction in 1924, the first basic improvement in wire rope in 100 or more years.

Where to Get: Preformed Wire Rope Information Bureau, 520 North Michigan Ave., Chicago, Ill. (Free)

Title: **"Mining Directory of Minnesota, 1944"**

Subject: The twenty-fifth annual publication of the Mines Experiment Station, Institute of Technology,

Rebuild your TRACTOR GROUSERS WITH BULLDOG Grip-Lugs



Easily Welded
Other Products
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Digger Teeth
Excelloy Overlay Metal
Send for Folder EE5
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GOOD FOR YEARS OF HARD SERVICE
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A Time-Saving ACCESSORY

Beco BLOCKS & LININGS
Beco Blocks and Linings take the heavy loads at the increased speeds demanded of modern excavating equipment. These Beco products are durable and tough — that's why replacements and adjustments are less frequent.
T34A
BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

Where was this Photograph taken?

It could be almost any construction scene of heavy equipment at work, but as a matter of fact it shows an Army Engineer Corps job on the shore of Amchitka in the Aleutians.

The shovel is a Bucyrus-Erie 54-B Diesel and it was engaged in dumping spoil material on the beach when the picture was made.

Like other Bucyrus-Erie shovels, as well as draglines, dredges, scrapers and other kinds of equipment, the 54-B Diesel Shovel uses Timken Tapered Roller Bearings to help provide faster, smoother operation; to ward off the attacks of friction; radial loads, thrust loads or any combination of them; and to hold moving parts permanently in alignment. Timken Bearings are installed in the boom hoist, swing unit and engine takeoff clutch.

As an important factor of dependability, endurance, low maintenance and long life in construction machines of every kind, the use of Timken Bearings is especially valuable when equipment is operating where adequate repair facilities are not available — as in various theaters of war.

You'll need more Timken Bearings in your equipment to meet postwar competition; it will pay you to make sure you get them. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

University of Minnesota, concerning the iron mining industry. Part I contains maps showing location of the mines and reserve properties listed in Part II. Part III contains a list of all the operating companies and the major holding organizations that are identified with the Minnesota iron ranges, together with a list of the officials, subsidiary and affiliated companies, and the properties in which they are interested. Part IV contains general statistics of the iron ore industry.

Where to Get: Institute of Technology, University of Minnesota, Minneapolis, Minn.

Title: **"Dressers for Blast Hole Drill Bits"**

Subject: A new 24-page bulletin describing Bucyrus-Erie Company's No. 8 and No. 9 blast hole drill bit dressers. Fully illustrated with photographs, explanatory drawings, and diagrams of efficient shop layouts, this two-color booklet tells how the driller can get faster dressing for his bits with less waste of steel and with fewer sharpenings by using the No. 8 for bits up to 6⅝ inches and the No. 12 for bits up to 12" diameter.

Where to Get: Bucyrus-Erie Co., Publicity Dept., South Milwaukee, Wis.

Title: **"Canadian Mines Handbook"**

Subject: Chief development in the mining industry during the past 12 months has been the revival of interest in gold, according to the latest edition of this handbook. With the improvements in the war metals situation, prospectors turned once more to a search for the yellow metal and discoveries in many parts of Canada have resulted.

The Handbook lists 6,663 companies and syndicates, as compared with 6,300 in the 1943 edition. Part I gives the details on 810 active corporations, including approximately 300 formed in the past year, while Part II deals with 5,853, most of which are quiescent.

Where to Get: Northern Miner Press Limited, 122 Richmond St., West, Toronto, Ontario, Canada (Price $1.00).

Title: **"Speaking of Service"**

Subject: A two-color 36-page booklet, highly illustrated, telling of the service performed, the personnel, shops, tools, products and shipping facilities of the H. O. Penn Machinery Co., Inc., of New York City.

Where to Get: H. O. Penn Machinery Co., Inc., New York City. (Free)

Title: **"Postwar Prospects"**

Subject: Brochure designed by Hamilton Bridge Company, Ltd., of Hamilton, Ontario, Canada, to give U. S. manufacturers of metal products a more intimate knowledge of opportunities for them in Canada.

Where to Get: Hamilton Bridge Company, Ltd., Hamilton, Ontario, Canada. (Free—to company executives only.)

Title: **"New Cement Plant Bulletins"**

Subject: Summarization of operating features, and uses of portable cement plants, manufacture, and general specifications.

Where to Get: C. S. Johnson Company, Champaign, Ill. (Free)

Title: **"Ditching with Dynamite"**

Subject: This booklet fully explains and illustrates the technique of using Du Pont Ditching Dynamite.

Where to Get: E. I. du Pont de Nemours and Company, Inc., Public Relations Dept., Wilmington 98, Delaware.

Title: **"Building Construction Cost Data"**

Subject: A 48-page booklet of tabulated cost data intended primarily for use in making up engineering estimates on building construction. Also would be useful in checking extras, in making estimates for partial payments to contractors during the course of jobs, for converting from cost plus to lump sum and for making preliminary estimates. The figures are broken down for labor and material and are arranged alphabetically with A to Z index tabs.

Where to Get: R. S. Means, 2865 S. Buchanan St., Arlington, Va. ($1.60)

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TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

FOR SALE

¾ Combination Steam Crane. Bucyrus-Erie Type B. New flues. Perfect condition.

¾ Bucyrus-Erie Type B Shovel. New flues. Perfect condition.

No. 60 Caterpillar, equipped with bulldozer. Located in Detroit. Box 3060

SPECIAL OFFERINGS ATTRACTIVELY PRICED IN DESIRABLE SHOVELS, CRANES AND DRAGLINES. IT WILL PAY YOU TO GO OVER THIS LISTING CAREFULLY

1—Lorain 40 Truck Crane with 70' boom, on a 10 wheeler pneumatic tired truck.
1—1½ yd. Lorain 75B crane, dragline, 70' boom and shovel attachments if desired.
1—Bucyrus-Erie 10/20 shovel and crane combination rebuilt.
1—1940 Bay City Model 25 backhoe and crane ½ yd.
1—1939 Bucyrus-Erie 20B shovel and backhoe ¾ yd.
1—Byers backhoe and shovel combination Bulldog type—rebuilt.
1—1939 Marion ¾ yd. backhoe, shovel and dragline combination.
1—Lorain 40—¾ yd. shovel, crane and backhoe combination.
1—Lorain Model 55 shovel and crane—excellent condition—1 yd.
1—Koehring Model 301—¾ yd. shovel and backhoe.
1—Koehring Model 401 shovel and crane combination.
1—Bay City 1940 Model 25—½ yd. backhoe and crane combination.
1—Diesel 1½ yd. Koehring Model 502 shovel.

On account of limited space we would ask you to write for complete listing on shovels, tractors and draglines.

ECONOMY COMPANY INC.

49 Vanderbilt Avenue
New York City 17, New York

Telephone—Murray Hill 4—2294—8292—2295—2296—2893

FOR SALE

Three (3) 1¼ cubic yard Bucyrus-Erie Type GA-2 Combination Machines

Shop numbers 4150, 10269 and 10427 all reconditioned and ready to work, powered with Waukesha Type "WK" 4 cylinder 6¾ x 8 gasoline engines overhauled ready for work. Varying front end attachments available including one standard shovel attachment, one dragshovel attachment and several clamshell, dragline and lifting crane attachments with 40', 45' and 50' booms. Ready for inspection. All located in my yard in Oklahoma City.

Leo Sanders
521 Tradesmen's National Bank Bldg.
Oklahoma City, Oklahoma

FOR SALE

Northwest Shovel—Model 5, 1¼ cu. yds. Gasoline combination. Bucyrus-Erie, Steamshovel-GA-3, 1 cu. yd. gasoline combination. Osgood Shovel—Model JMS Conquerer, 1 cu. yd. gasoline combination. Marion Shovel Model 7, 1 cu. yd. gasoline. Northwest Shovel Model 105, 1 cu. yd. gasoline.

2 Lorain shovels model L-55, 1 cu. yd. gasoline. These machines are in good condition. We sell at 55% of new price or less.

Write Box 855 Equity, 113 West 42nd St., New York 18, New York

FOR SALE
Model 2 NORTHWEST Shovel-Crane, ⅝ yd. Rebuilt. Shipment in September.
1¼ yd. OSGOOD Crane. 26" Treads. New Boom. Rebuilt. Immediate Shipment.
Model 301 KOEHRING Shovel. "As is" shipment in September.
1—¾-yd. Model 301 KOEHRING Shovel. Immediate shipment.
For Rent Only: 4 D-8 Tractors with double-drum LeTourneau power control units.
1 D-7 Tractor with Bulldozer. Box 3066

FOR RENT OR FOR SALE
Koehring 1½ yd. Dragline—55 ft. boom.
A. W. Nevers
Mt. Pleasant, Iowa

FOR SALE
One Model 41-B Bucyrus steam shovel, shop No. 5030, mounted on standard caterpillar type traction and equipped with 21' boom, 15' handle, 1¼ cu. yd. dipper. Box 3067

LIQUIDATING CONTRACTOR'S PLANT
½ cu. yd. General Backhoe, Shovel and Crane. 105 Northwest Crane and Shovel Combination. Cleveland Backfiller. 2 Ton Crawler Cranes. 65 H.P. Economic Boiler 100 lb. Stock and Fittings (Coal). 18 H.P. Vertical Boiler 125 lb. Pressure, complete fittings (Oil). 2—8000 gal. Tanks—Coils. 5 Portable Compressors, Jack Hammers, R-4 Bulldozer. Sheeting Hammers. Air Hoist, 7 cu. ft. to 28 cu. ft. Gas, Electric and Steam Mixers. Jetting Pumps. Pipe line testing equipment. 2 drum electric hoist. 20 Ton, 10 Ton and 3 Ton Trailers. ¾ cu. yd. to 1½ Buckets, Excavating, Rehandling, Pulpwood, Grapple. Shovel Fronts for ¾ cu. yd. Koehring, ½ cu. yd. Lorain 35, 1 cu. yd. P&H 600. Byers Bearcat Crane—backhoe attachment. 5 Ton Gas Roller—10 Ton Steam. Welding Rods. 2—6 cu. yd. Watson Wagons. 25 Ton—30 Ton Std. Gauge Locomotives; 2—6 Ton 36" Gauge Gas; 2—12 Ton 36 Gauge Steam. Pipe Threading Machines 2" to 8". Complete Concrete Mast and Chuting Outfit. Hydraulic Jacks. Asphalt Heaters. Turnbuckles, Rope Blocks, Large Quantity All Weights Railroad switches, frogs, compromise joints, bumpers, Steel Sidewalk and Curb Forms. Large stock Parson trencher and Cotta transmission spare parts. ALL IN EXCELLENT CONDITION. Equipment Service, Box 75, Valley Stream, New York. Hollis 5-4315.

FOR SALE
Fairbanks-Morse Diesel Engine 210 HP, 360 RPM 6-cylinder, 10" x 12½" Model 44 HD10. Box 3057

FOR SALE
DRAGLINE BUCKETS
1—¾ cu. yd. Type AU Light Weight Dragline Bucket
1—1 cu. yd. Type AU Light Weight Dragline Bucket
3—1¼ cu. yd. Type AY Heavy Duty Dragline Buckets
1—1¼ cu. yd. Type AX Medium Duty Dragline Bucket
BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

FOR SALE
One eight-inch heavy duty Butler, Tell-Tale Sand and Gravel Pump. Extra shafts, impellers and liners. $500.00 Cash. Box 3064

DIESEL ENGINE—Fairbanks-Morse Model 32E12, three-cylinder, 12" x 15" heavy duty, two cycle, rated 180 HP continuous duty, 360 RPM, complete with all accessories, extended pulley shaft, clutch, pulleys, etc. This engine was sold new in March, 1942 and has been used only 1500 hours.

Price $8200.00 f.o.b. Louisville, guaranteed.

ROY C. WHAYNE SUPPLY CO.
800 W. Main St. Louisville 2, Ky.

FOR SALE
1—1½-yd. Pettibone-Mulliken Manganese Front Shovel Dipper, available for immediate shipment without priority. Box 3068

FOR SALE
Armstrong No. 29 Electric Blast Hole Drill. Serial No. 24714, complete with standard tools, cables, motor and controller. Condition Good. Now Operating. Box 3070

FOR SALE
One (1) slightly used Bucyrus-Erie Model H-74 wheel type Scraper, 8 to 9 yard heaped capacity, 7 yard struck capacity, with two 13.50 x 20 sixteen ply tires, suitable for use behind International TD-18, "Caterpillar" D7 or comparable size tractor. Located West Va. Box 3065

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS
2—⅜ cu. yd. Skimmer Scoop Dipper—10-B.
2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1 cu. yd. Drag Shovel Dipper—29-B.
1—1¼ cu. yd. Cast Front Dipper—GA-3.
1—1¼ cu. yd. Inserted Type Dipper—30-B, 42-B, E-2, 41-B and 43-B.
1—1¼ cu. yd. Drag Shovel Dipper—33-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper—42-B.
1—1½ cu. yd. Snow Loading Dipper—10-B.
1—2 cu. yd. Rock Dipper—75-B.
1—2¼ cu. yd. Inserted Type Dipper—50-B.
1—2¼ cu. yd. Inserted Type—55-B.
1—2¼ cu. yd. Rock Dipper—75-B.
1—2½ cu. yd. All Cast Dipper—55-B.
1—2¾ cu. yd. Light Duty Shovel Dipper—54-B.
1—3½ cu. yd. Coal Loading Dipper—75-B.
1—4 cu. yd. Type IV Medium Duty Dipper—100-B.
F.O.B. Works
Write for any further information desired.
BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

7—Allis-Chalmers Speed-Ace
TRACTOR WAGONS
7½ yd. cap.
(Write for illustrated bulletin)
IRON & STEEL PRODUCTS, INC.
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"Anything containing IRON or STEEL"

FOR SALE
5 New, Goodyear, earthmover tires and tubes at cost.
3 size 1600-20; 2 size 1400-20. 16 Ply. Box 3054

FOR SALE
Howe truck scale, 22 ft. long. Like new. $450.
Ridge Coal Company
Sugarcreek, Ohio

FOR SALE
Plymouth and Milwaukee gas locomotives, 8, 12, 25, 35 tons, 36" and std. ga., A-1.
Davenport, Porter, Vulcan 18 to 20-ton steam 36" gauge S/T locomotives (4), rebuilt.
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Vulcan 18-ton steam S/T locomotive, 42" ga.
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Bucyrus 50B and 80B steam shovels.
Gyratory crushers, 12", 21", 27".
Pioneer 300W portable gravel washing plant.
Sturtevant No. 2 rotary fine crusher.
Monighan 3-yd. electric Walking dragline.
Hydroelectric plant, 1000 HP, 60' head, a.c.
Euclid 6-yd. bottom dump crawler wagons (8).
Boiler tubes, 236—1¾"x5', ferrules, new.
H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

FOR SALE
We own for quick shipment New Kohler 5 K.V.A., 115 V., A.C. Automatic Plants. Used Universal 4 K.W., 110 V., D.C. Plants. Used Model D Kohlers.
REPUBLIC ELECTRIC CO.
Davenport, Iowa

FOR SALE
Excellent condition REX 34-E dual drum paver complete, serial No. GG149, which was bought new 3-16-44. Box 3056

FOR SALE OR LEASE
Brazil Block Coal stripping proposition on Big Four RR near Clay City, Indiana. Three track tipple with shaker screens and miscellaneous small equipment, ready to operate. Half-million tons of coal owned or under lease and additional acreage available. Excellent proposition for operator having idle stripping equipment and desiring to get into immediate production of coal.
Address C. E. Hines, Worthington, Indiana; Roy E. Price, 411 Indiana Trust Building, Indianapolis 4, Indiana.

FOR SALE
One 2½-yd. Marion shovel Model 392, new late 1939, complete with dragline equipment, dragline bucket, lighting plant, powered with Waukesha "Hesselman" engine, price 55% of new price. Reply to Box 3063.

FOR SALE
1—4 cu. yd. steam skid and roller Monighan dragline 100' boom good condition.
1—3 cu. yd. Monighan diesel electric 3T walker dragline 87' boom good condition.
Location both machines Arkansas. Box 3062

FOR SALE
Used 50-B steam shovel; 80-B steam dragline; Class 14 steam dragline; all Caterpillar mounted and now operating. Box 3052

WANTED
Want to buy complete bulldozer equipment for a 35 Diesel Caterpillar tractor. New or used. Please state make, model, and condition.
Chestertown Brick Company
Chestertown, Maryland

WANTED
5-6 yd. Dragline Shovel. 40 ton Whirley Crane, 45' rad. 9x16, or about Portable Rock Crushing Plant. V7 or 8 with winch, dozer. 8-9 yd. LeT. Carryall Scraper. Maintenance Roller 112 Diesel RD7. Trenching Mac. will dig 24" up wide, 5' deep, dig bet. trees orchard. 30-35 Cat. with drum, blade. D8, RD8, AS IS. Also with Dozer, Drum, Angledozer, Power Takeoff for 60 Cat. RD8 with Bulldozer. These wanted for resale. GIVE ALL DETAILS. Serials, rubber condition.
H. STEIN
942 Market
San Francisco 2, California

POSITIONS WANTED
HELP WANTED

Address all box numbers
c/o EXCAVATING ENGINEER
South Milwaukee, Wis.

TRACTOR EQUIPMENT SERVICE MAN AND DEMONSTRATOR
Must be a good Bulldozer operator, and familiar with operation of tractors and hauling scrapers. Should know welding, and be a good mechanic. Should have a car and be willing to travel. Permanent connection for the right man. Box 9231

MALE HELP — WAR WORK
TRUCK MECHANIC; thoroughly experienced in heavy duty truck and tractor repairing. Steady. 100% war work.
BRUCE & COMPANY TO. 8-6821
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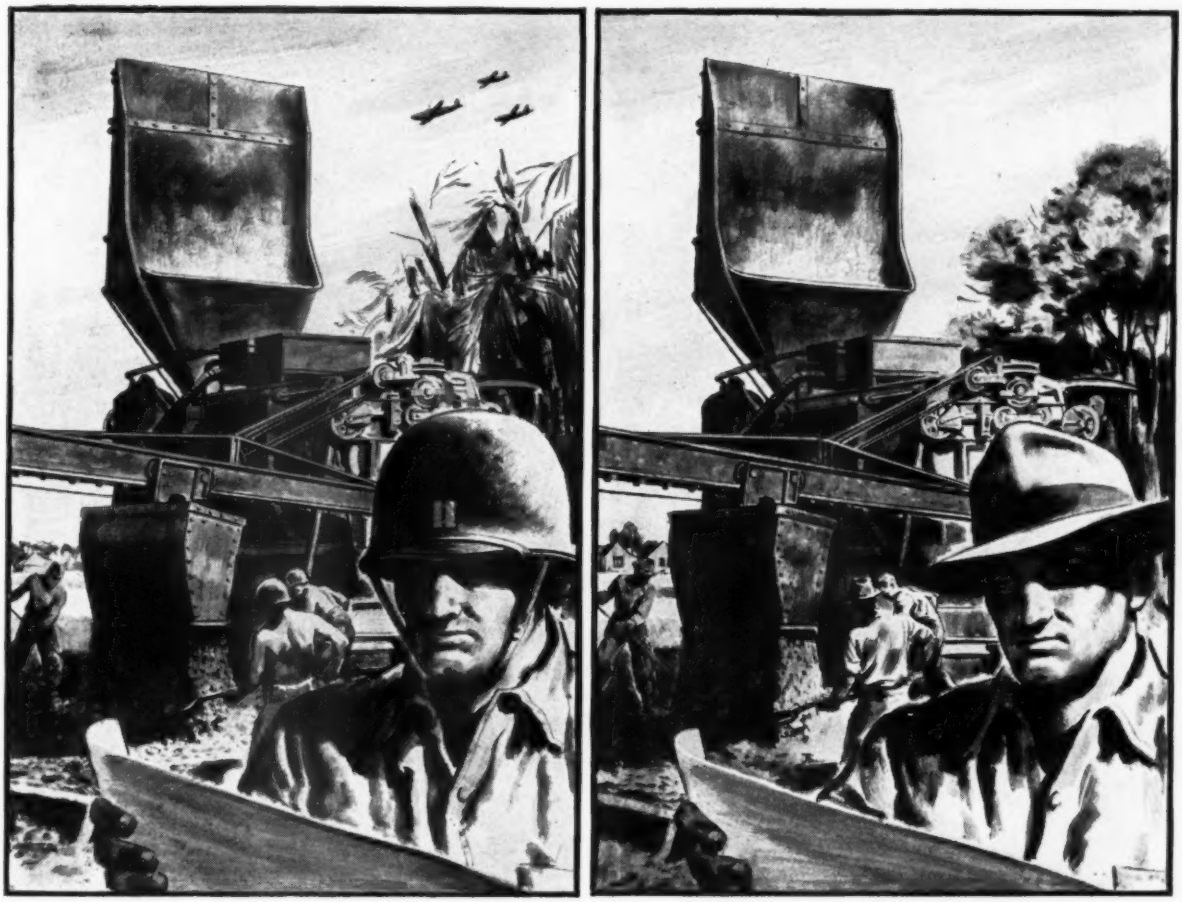
EXPERIENCED OPERATOR
Shovel, crane, pull shovel and dragline operator. Capacities from ½ yd. to 5 yds. Steam, gasoline, diesel and electric. Can operate Bucyrus-Erie 120-B, Bucyrus-Monighan 5-W, Koehring, Northwest, P&H, Lima and Bay City machines. Also locomotive cranes. Prefer Bucyrus-Erie. 26 years experience. 2 years in South America. Willing to go any place in U.S.A. or South America. Not in the draft. Can overhaul and repair all makes of machines. Now located Wisconsin.
Box 9232



BRIDGING THE GAP to Peacetime Jobs... American Road Builders' Plan points way

Every day brings us closer to a most important wartime problem, *i.e.*, peacetime jobs for the boys who are winning the war.

The American Road Builders' Association has submitted a comprehensive plan for post-war roads and jobs. It calls for construction of needed new highways and improvement of the present United States highway system, including bridges and grade crossings. It would create jobs for millions of men.

3,000,000 jobs on highway construction alone. Millions of other jobs making and supplying machinery and materials. Jobs all over the country. Jobs that would pay good wages. Jobs that would greatly improve the America we love.

There's an inspiring 64-page booklet, "A SOUND PLAN FOR POST-WAR ROADS AND JOBS," prepared by the Association. Get a copy today. Write for it to The American Road Builders' Association, 1319 F St. N.W., Washington 4, D. C.

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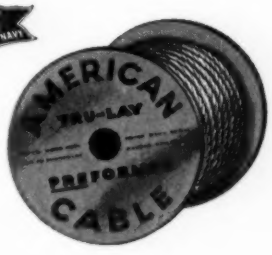

AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONNECTICUT

A BOY DIED LAST NIGHT..

A BOY died last night. It doesn't make much difference now about his name. It might have been your son, your brother, your husband. The important thing is that he died, in poignant and awful loneliness out somewhere on a waste of sand, out in a starless silence, 10,000 miles from home.

"Missing in action" read an obscure line in this morning's communique. That was all. Now he lies there, a crumpled, twisted mass of flesh, that yesterday was his body. The fine head and the shining face and the broad shoulders remain only in a picture that looks out upon a quiet living-room on a shaded street an eternity away.

Last night, in those agonizing hours of unspeakable isolation, he went through a thousand deaths without the one thing that might have helped a little — the sound of a familiar voice, the pat of a friendly hand. Many people died last night in their beds at home, surrounded by those who cared. Last night he died in utter desolation in an unimaginable loneliness.

The pain was terrible enough. But then there had to be that dreadful burden of thought in those endless last hours. Mom and Pop. The flowers blooming again in the backyard. The good old roadster in the driveway. That last sweetheart kiss at the station. Those dances last summer. That half-finished letter in his blouse. All those plans for the future. Couldn't somebody find him, please? The wracking pain again.

Too much for you, all this? But it really happened last night, just like that. It's going to happen a thousand times — ten thousand times, and perhaps a million times in the nights to come. If people could only understand it. If they would just grind deep into their thinking the stark, terrible reality of it, every petty, selfish interest would be swept away. They would sacrifice anything and everything just to make themselves worthy of that boy.

He died last night, you see. There's no way to get around that.

— John H. Hoagland in the Louisville Courier-Journal

18" x 12" reprints of this advertisement available on request

HOW TO HELP WIN THE VICTORY . . . — AND PEACE!

- Place Idle Equipment in Essential Industries
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- Urge Completion of Plans For Postwar Projects
- Help Plan Jobs For Returning Service Men
- DONATE YOUR BLOOD • TURN IN SCRAP METAL • BUY AND KEEP WAR BONDS • SAVE WASTE PAPER • NEVER PAY OVER CEILING PRICES

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